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TROPICAL DISEASES BULLETIN

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Vol. 5. 1915. No. 4.

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OF THE
TROPICAL DISEASES
BUREAU.

COMMONWEALTH MYCOLOGICAL INSTITUTE
26 MAY 1971

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THE DIRECTOR OF THE BUREAU.

London:
TROPICAL DISEASES BUREAU,
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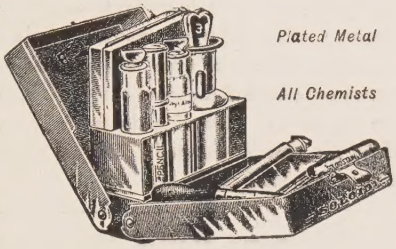

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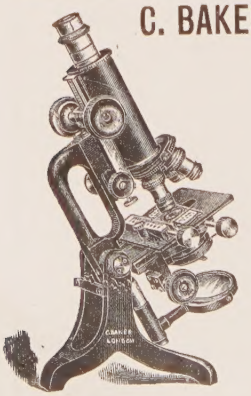

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TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 5.] 1915. [No. 4.

AMOEBIASIS AND DYSENTERY.

Amoebiasis.

Debono (P. P.). **On the Occurrence of Amoebiasis in Malta.**—*Jl. of State Med.* 1914. Oct. Vol. 22. No. 10. pp. 625–629.

This is a short account of 28 cases of amoebic dysentery occurring in Malta, a locality in which, though previously suspected, it had not been proved to exist. In most of the reported cases the illness was of a severe nature, terminating in five instances in death. No exceptional features either in the biological habits of the amoebae or in the sequence of symptoms were noted. Speculating upon the various means by which the amoebae are conveyed from one person to another in a Maltese community the author was led to suspect the water cisterns of which two are generally found in each village; he found the majority of his cases were grouped round these.

In view of the author's experience it is not surprising to find that abscess of the liver is by no means rare in the island, 41 cases having been recorded during the last thirteen years from the Central Hospital; both miliary, multiple and large solitary abscesses are included in this series. Though amoebae have not been found in every sample of liver pus, yet in nearly every case it was either sterile on culture or scars of ulcers were found in the intestinal canal, thus suggesting the probable amoebic nature.

P. H. Bahr.

Boeri (Giovanni). **Su di una Dissenteria Amebica Nostrale.** [On a Local Form of Amoebic Dysentery.]—*Malaria e Malat. d. Paesi Caldi.* 1914. Sept.-Dec. Vol. 5. No. 5/6. pp. 352–364.

A report of five cases of amoebic dysentery treated in the hospital at Cagliari, the point of interest being that none of the patients had lived outside the island of Sardinia prior to the supervention of symptoms. Four of the patients were middle-aged men and one a woman. Cases of amoebic dysentery of local origin have been previously reported from Sardinia by Fenoglio, and recorded in the years 1890, 1900 and 1904; but the author thinks it important to add to their number. In one of the cases a rapid cure was effected by injections of emetin, while in another ipecacuanha was used with good effect. The remaining three cases were of a less conclusive character, there

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being some doubt as to whether the amoebae found in the stools really belonged to the *histolytica* type. In each of the cases the possibility of the dysentery being due to bacilli was excluded by the usual serum tests.

J. B. Nias.

LYNN (W. J.). **Report of an Unusual Amoebic Infection of the Genito-Urinary Tract.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1914. Sept. Vol. 2. No. 3. pp. 205–206.

This is a record, as the title implies, of a supposed infection of the urinary tract with *Entamoeba histolytica* through the introduction of a syringe, which had previously been used for rectal lavage, into the urethra. Vesical calculus was negative, though a prostatic stricture (due probably to an old gonorrhoeal infection) was found. A microscopical examination of the stools was negative as regards both amoebae and their cysts. Few details of the urinary analysis (save the occurrence of blood and pus) or of the biological characteristics of the contained amoebae are given.

[The record of this case does not bear any signs of detailed work and should be accepted with caution, as affording little proof that an obligatory intestinal parasite, such as the amoeba, is capable of flourishing and reproducing itself on the vesical mucosa.]

P. H. B.

PHILLIPS (Llewellyn). **Is Emetin sufficient to bring about a Radical Cure in Amoebiasis?** [Eighty-Second Annual Meeting of the British Medical Association. Section of Tropical Medicine.]—*Brit. Med. Jl.* 1914. Dec. 19. p. 1061.

The author, while fully recognising the beneficial effects of emetin in amoebiasis, especially in amoebic hepatitis, is inclined to think [and in this the reviewer is in agreement with him] that a prolonged course of injections is necessary in order to effect a radical cure. Emetine hydrochloride per se is very toxic to the *Entamoeba histolytica* in its vegetative stage, but the *tetragena* or cystic stage is quite refractory to this drug; this has been shown to be the case by VEDDER. In acute dysentery and in hepatitis it is the vegetative amoebae which give rise to symptoms, while the amoebic cysts are passed via the intestinal canal only during the quiescent periods. It is therefore necessary to employ some other drug which will destroy the encysted *tetragena* stage. It has been found by UJIHARA that both thymol and male fern in doses of from 3–7 grammes respectively will kill off amoebic cysts; salvarsan and neosalvarsan also appear to exert an inhibitive action in this respect and should be given a further trial. The author himself suggests the following line of treatment as being the one most likely to effect a radical cure:—The administration of emetine hypodermically for ten days or longer, or if the condition of the patient demand it, its oral administration as well. This is to be followed by subsequent courses, at increasing intervals, of calomel combined with thymol. No patient should be considered cured until after several examinations no cysts of *Entamoeba histolytica* are found in the faeces.

P. H. B.

KERMORGANT. **Mesures Prophylactiques prescrites par le Ministre des Colonies à l'Egard des Rapatriés d'Extrême Orient atteints Convalescents ou Suspects d'Amibiase.**—*Bull. Acad. Méd. Paris.* 1914. Séance du 14 avril. 3 ser. Vol. 71. (78e ann.) No. 15. pp. 546–547.

This short communication deals with measures recently instituted to prevent the introduction of amoebic dysentery into France by convalescents or others returning from the French colonies in the Far East. For this purpose four or five grains of emetine chlorhydrate is served out in powder form, dissolved in tincture of opium in the strength of 1 : 15. For prophylactic purposes 8-10 drops of this solution are dissolved in a cup of strong tea and given nightly. Injection of emetine by the subcutaneous route is reserved for those cases exhibiting acute symptoms, the method described above being solely for the latent cases, and for such as have diarrhoeic symptoms with or without mucous stools in which amoebae or amoebic cysts have been found. Failing a periodic microscopical examination of the stools, a regular increase or decrease of the body weight is taken as a rough index of the efficacy or otherwise of this drug.

Every ship's surgeon is directed to draw up a special report, which directly on arrival at Marseilles is forwarded to the Public Health Department.

P. H. B.

MAUREL (E.). **Contribution à l'Étude Expérimentale et Clinique du Chlorhydrate d'Émétine.**—*Arch. de Méd. Expérim. et d'Anat. Path.* 1914. May. Vol. 26. No. 3. pp. 225–250.

This paper for the most part consists of an historical retrospect of the chemical composition and therapeutic action of emetine, a subject on which in 1899 the author had commenced experiments. In 1901 and 1902 he summed up the results of his observations in seven papers submitted to the Society of Biology.

At present emetine hydrochloride has been employed therapeutically, apparently with success, in the following conditions :—

1. As a specific against the *Entamoeba histolytica.*
2. As a haemostatic in haemoptysis and oesophageal haemorrhage.
3. As a specific in hepatic congestion, in acute bronchitis and in bronchopneumonia in the aged.

The beneficial action of emetine in arresting pulmonary haemorrhage is all the more to be wondered at, seeing that experimentally in animals it has proved to have no action as a vaso-constrictor. Emetine apparently is not effective in producing the emetic or purgative action of ipecacuanha ; even in the pigeon, in which vomiting is easily produced, the dose of emetine sufficient to produce this emetic action is generally fatal.

P. H. B.

UJIHARA. **On the Amoebic Dysentery. I. Report.**—*Sei-i-Kwai Med. Jl.* 1914. Nov. 10. Vol. 33. No. 11. Whole No. 393. pp. 67–68. [The Original in No. 5. Vol. 28 of the *Jl. Tokyo Med. Assoc.*).

Ujihara formerly believed VIERECK'S *Entamoeba tetragena* to be quite distinct from SCHAUDINN'S *Entamoeba histolytica* but after further study he joined in the consensus of scientific opinion that these varieties are identical.

He found that the outer membrane of the cyst is resistant to the action of the gastric juice, but less so to the pancreatic secretion, bile and other substances which dissolve lipoids.

The cysts appear to be damaged by direct sunlight, but remain alive for months in dried faeces from which the sunlight is excluded. He found that under these conditions the cysts retained their shape and absorbed vital stains if warmed up to 50° C. daily. The specific gravity of the cyst is 1065, but how this figure is obtained is not stated. The method devised by the author for collecting the cysts is as follows : About 30 cc. of glycerin is added to 60 cc. of the filtrate, so as to make the specific gravity of the mixture as near 1070 as is possible ; this is then centrifuged ; to the supernatant fluid water is added till the specific gravity is about 1060 when it is centrifuged again and the sediment washed with water ; the remaining precipitate is washed with dilute hydrochloric acid and numerous cysts are found in the sediment.

Quinine in combination with tannin gives therapeutically satisfactory results in amoebic dysentery and may be administered by the mouth or as an enema ; thymol in combination with castor oil appears to be most effective in clearing out the cysts from the intestinal canal.

P. H. B.

DE BUYS (L. R.). **Amebic Dysentery in Children.**—*Jl. Amer. Med. Assoc.* 1914. Nov. 21. Vol. 63. No. 21. pp. 1806–1810.

This is an account of the clinical course and appropriate treatment with emetine of four cases of amoebic dysentery in white children under four years of age.

The rarity of the disease, especially in children in Louisiana, is shown from figures provided by the author. During the last eight and a half years 94,161 patients have been admitted and of these only 313 were cases of amoebic dysentery and four only occurred in children under twelve years of age.

Comparatively large doses of emetine (about grs. 1) administered by the hypodermic route were well borne and exercised the customary rapid and beneficial effect.

P. H B..

HARPUR (F. J.) & HADDAD (W. B.). **Emetine Injections in Amoebic Dysentery.** [Correspondence.]—*Lancet.* 1915. Jan. 30. p. 255.

This note records the successful treatment by hypodermic injections of emetine of outpatients in Egypt. Large doses (grs. 1) at each injection were employed and no restriction in diet could be enforced. The results were consistently good.

P. H. B.

BRÉAUDAT (Yersin) & LALUNG-BONNAIRE. **La "Simaroubine" dans la Dysenterie Amibienne.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon* (1913). 1914. pp. 101–104.

This paper is a preliminary communication on researches on the active principles of simaruba and their action in dysentery. Powdered simaruba bark is treated in a way which is detailed and a solution is obtained, 10 cc. of which contain ·080 milligrammes of an active substance and correspond to 5 grams of the powdered bark.

This solution when injected into monkeys in a dose of 10 cc. per kilogramme body weight did not produce the least disturbance.

Following on this, seven cases of dysentery were treated with simaruba in Annam; six were in natives, one in a European; all apparently amoebic in origin. The results were highly satisfactory, though sufficient time had not elapsed to state whether relapses occurred or not.

P. H. B.

DE LANNEY (E. L.). **Treating Gelatin Capsules with Formaldehyde Solution for Ipecac Medication.**—*Milit. Surgeon.* 1914. Oct. Vol. 35. No. 4. p. 320.

The writer found that by soaking gelatine capsules in a 20 per cent. solution of formaldehyde and thereafter drying and filling them with 1 gramme of powdered ipecacuanha powder he was able to obtain good results in the treatment of amoebic dysentery cases in which the plain gelatin capsules had failed to effect a cure. Latterly he has had good results from a combined treatment of ipecacuanha enclosed in these capsules together with emetine injections.

P. H. B.

NILES (George M.). **Some Remarks on the Treatment of Amoebic Dysentery.**—*Amer. Jl. Med. Sci.* 1914. Oct. Vol. 148. No. 4. [No. 511]. pp. 526–530.

With reference to emetine the author records his belief that small doses do not satisfactorily eradicate the amoebae, but that maximum doses, 2 or 3 grains, should always be given, if tolerated by the patient.

A new method of treatment, namely, the injection of kerosene oil, is recommended. For an adult about one pint of pure oil should be employed and, with the patient in the knee-elbow position, should be introduced by means of a colon tube. The oil should be retained for 30 to 40 minutes before being allowed to escape. This injection should be repeated daily for three or four days and then occasionally as required.

P. H. B.

WICK. **Uzara bei Amöbendysenterie.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. July. Vol. 18. No. 14. pp. 490–493. With 2 curves.

Uzara is a native medicine made from the roots of a herb growing in the region of the African great lakes. The author was first stimulated to give the drug in tabloid form a trial (quantity not stated)

after the publication of successful cures in amoebic dysentery by WALDOW and GÜHNE (May 1912, *Archiv. f. Schiffs- u. Tropen-Hygiene*). The present paper deals with but two cases of amoebic dysentery in which the results were so marked and rapid as to be worthy of publication.

[In the two cases the patients' temperature and number of stools rapidly fell to normal, but it is doubtful whether equally good results could not easily be obtained with the old fashioned ipecacuanha treatment, and certainly with the more modern injections of emetine.]

P. H. B.

BAETJER (Walter Albert) & SELLARDS (Andrew Watson). **The Behaviour of Amoebic Dysentery in Lower Animals and the Bearing upon the Interpretation of the Clinical Symptoms of the Disease in Man.**—*Bull. Johns Hopkins Hosp.* 1914. Aug. Vol. 25. No. 282. pp. 237–241.

This paper contains a considerable amount of information which has been since incorporated in the longer and more explicit communication on the whole subject of amoebic dysentery summarised below. The main points in this preliminary paper are as follows :—

The clinical course of amoebic dysentery in cats corresponds closely to the typical clinical picture of the disease as it occurs in man ; even the acute and chronic stages and carriers of the infection are produced in these animals. No experimental evidence was obtained suggesting the occurrence of an intestinal amoebic infection without the production at the same time of the symptoms of dysentery.

Amoebae recovered from atypical clinical cases of amoebic dysentery in man reproduce the same atypical symptoms when injected into cats.

A new point the authors appear to have brought out is that guinea-pigs are susceptible to infection, but that these rodents are quite unsuitable for study on account of the atypical course the disease runs in them and their extreme susceptibility to secondary bacterial infection ; in fact bacterial septicaemia was the cause of death in the majority of the infected cats and it is suggested that a similar process occurs in fatal cases of amoebic dysentery in man.

P. H. B.

SELLARDS (Andrew Watson) & BAETJER (Walter Albert). **The Propagation of Amoebic Dysentery in Animals and the Recognition and Reproduction in Animals of Atypical Forms of the Disease.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1914. Oct. Vol. 2. No. 4. pp. 231–245.

The attempts of various authors to secure the propagation of dysentery through a series of animals having failed, even under the most favourable conditions, the authors utilized a method of direct inoculation into the lumen of the bowel. A small incision is made in the abdomen in the mid line, exposing the caecum. A syringe needle of moderate bore is inserted at an angle into the lumen of the bowel so as to form a valve and the material containing amoebae injected. After the needle is withdrawn the puncture wound may be cauterized or the serosa sutured over it, should there be any tendency to leakage.

After a few subinoculations in kittens the amoebae apparently increase in virulence, so that infection by intrarectal injection becomes more certain of success. By the intracaecal route 100 per cent. of the inoculated animals became infected. For this several explanations are advanced: in the first place the necessity of employing diluting agents is avoided, and secondly the material is injected directly against the bowel mucosa. Moreover, the general anæsthesia required probably prevents the prompt expulsion of the material introduced.

No evidence was obtained that by scarifying the mucôsa with a syringe needle the amoebae are enabled to gain entrance to the bowel wall and reproduce their typical lesions.

During the last year, by using this method combined with injections by rectal tube, the authors have been able to transmit the infection through eleven successive generations in cats without finding evidence of either decrease in virulence or morphological changes in the amoebae, provided that these are obtained from the site of active lesions. The material used was obtained from a patient who had contracted the disease three years before in the Philippines and had had several courses of emetine treatment. The first inoculation was made with material obtained during a typical acute exacerbation and after the patient had received 2–3 grains of emetine hypodermically for three days. It was found essential, in order to obtain favourable results, to select material at the first onset of symptoms when the dejecta consisted almost entirely of blood and mucus and abounded in active trophozoites. Kittens one half grown or younger were found to be the most susceptible, adult cats being distinctly resistant to infection. Considerable difficulty was experienced on account of the increasing virulence of the accompanying bacteria; after the third or fourth transfers this became so marked that it was at times practically impossible to avoid creating a general peritonitis.

The dysentery induced by these means was uniformly fatal in the young animals and the incubation period showed marked constancy in the earlier, but became definitely shorter in the fifth and sixth passages. In the animals which died a septicaemia due to a streptococcus was almost invariably found. In these cases the amoebae in the intestine were found to degenerate rapidly and often failed to infect, even when injected into animals immediately post mortem.

Morphologically the typical organisms obtained from the stools at the onset of symptoms or from the site of the active lesions at autopsy showed no diminution in size, nor loss of mobility nor degenerative changes.

With the exception of a few of the rarer complications, such as brain and splenic abscess, all of the conditions occurring in man are also found in experimental animals.

In the majority of the younger animals the disease manifested itself as a typical acute infection ending in death at an early date without cessation of the acute dysenteric symptoms. In other cases, especially in adult animals, chronic infections with typical remissions and periods of acute relapse occurred. Many of these cases terminated in recovery and one animal became a carrier of

infection. One chronically infected animal developed a large hepatic abscess which contained no pus, but merely soft necrotic tissue abounding in active amoebae. From a study of the terminal septicaemia, to which reference has been made, it seems probable that a similar process occurs as a terminal event in man, as is suggested by the large number of positive cultures obtained by STRONG from various organs studied at autopsy.

No experimental evidence was found to support the view that extensive lesions of the intestine are able to develop without dysenteric symptoms.

Several atypical strains and their effect on inoculation were studied. These were derived from cases showing a mild, but continuous diarrhoea in the stools of which was contained scanty amoebae atypical in that they were smaller in size, in possessing nuclei rich in chromatin and in their resistance to emetin medication, but which produced dysenteric symptoms and lesions in animals. More surprising still is the fact that in one instance at least the disease in the kitten partook of the same clinical manifestations—a chronic diarrhoea with continuous watery discharge—as in the patient from whom the material was originally obtained. The authors conclude that possibly these amoebae either are a separate species or have been much modified both in their morphological and pathological properties by a long continued existence under unfavourable conditions in the human host.

[It need hardly be added that this, coming from such a source, is an extremely valuable paper and should be studied in the original by all interested in the subject.]

P. H. B.

SELLARDS (Andrew Watson) & BAETJER (Walter Albert). **The Experimental Production of Amoebic Dysentery by Direct Inoculation into the Caecum.**—*Bull. Johns Hopkins Hosp.* 1914. Nov. Vol. 25. No. 285. pp. 323–328.

This paper deals more fully with the method of intracaecal injection of amoebic dysentery material. At first the authors attempted to obtain better results than were possible by the intrarectal injection method by introducing the entamoebae under the uninjured mucosa of the intestine; it was found, however, that the majority of adult cats treated in this manner died from septicaemia, while monkeys failed to become infected at all. The authors then developed the idea of inoculating the material directly into the caecum. After the laparotomy a syringe is filled with the material to be inoculated before being connected with the needle. A moderately large puncture wound can be made in the gut, the syringe needle withdrawn and the peritoneum closed without further precautions and it is not necessary to comminute larger flakes of blood and mucus in order to facilitate introduction.

In the cat injections were made as a routine measure into the caecum on the supposition that the entire large bowel was susceptible to infection as in man; it was subsequently found, however, that the seat of election in these animals is the lower part of the rectum. The regularity with which the lesions appeared in this part of the bowel after

inoculation through the caecum is strong proof in favour of the penetration of *E. histolytica* through the uninjured mucosa; injury of the bowel wall by scarification or by other means invariably failed to produce infection at the site of injury. The success of these intra-caecal inoculations made possible the testing of a variety of strains of amoebae from widely separated geographical areas. With the exception of those animals which died from secondary causes, there were no instances of amoebae failing to infect, which is all the more remarkable since some of the patients from whom the material was derived did not show at the time any of the characteristic symptoms of dysentery.

The authors consider that this method will be extensively used in the diagnosis of amoebic enteritis in those cases in which the amoebae are extremely scarce or their morphology is quite atypical. With a more certain method for producing infection in animals it will be possible to study aberrant forms and to test experimentally whether some of the amoebae which are supposed to be morphologically constant may not really be subject to variation.

P. H. B.

MARSHALL (Alexander). **A Simple Method of Staining the Amoebae Parasitic in Man.**—*Laboratory Jl.* 1914. Sept. pp. 1.

The author, working in Khartoum, uses the following technique :—

" 1. Make smears from dysenteric stools and without allowing them to dry transfer rapidly to Schaudinn's fixing fluid [sublimate-alcohol].
" 2. Wash in graded alcohols and finally in distilled water.
" 3. Stain with Ehrlich's haematoxylin for 20 minutes.
" 4. Wash with tap water.
" 5. Stain with carbol fuchsin as for tubercle bacilli.
" 6. Wash with tap water.
" 7. Differentiate thoroughly with Sprengle's picric acid solution (absolute alcohol and saturated aqueous solution of picric acid in equal parts).
" This solution is to be applied from three to five minutes, during which it should be changed three or four times.
" 8. Dehydrate with absolute alcohol, clear in xylol and mount in Canada balsam."

" The nuclei of the parasite assumed a purplish-black hue and stood out from the surrounding cytoplasm, which acquired a pale translucent yellowish tint. The nuclear structure of the cells was clearly and sharply defined. Red blood corpuscles were stained a light yellowish colour."

H. B. Fantham.

CRAIG (Charles F.). **Observations upon the Morphology, Life-Cycle and Relation to Disease of** *Entamoeba histolytica.*—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1914. Sept. Vol. 2. No. 3. pp. 169–184. With 2 plates.

This paper contains a summary of recent knowledge of *Entamoeba histolytica* Schaudinn, 1903, emend. Walker, 1911. The subject has been reviewed many times in this *Bulletin* recently. However, a few interesting points may be noted or emphasised.

The author insists on the important fact that the morphology of the amoeba varies greatly at different stages in its life-cycle. The cycle may be divided into three periods, the trophic, pre-cystic and cystic. These are then discussed separately, as seen in living and in stained preparations. In the living condition the cysts of *E. histolytica* vary from 10μ to 20μ in diameter, the cyst wall is delicate and hyaline, having a single outline in the younger cysts and a double outline in the older ones. Reference is made to the important work of WALKER and SELLARDS (1913), summarised in this *Bulletin* (Vol. 3, p. 63), on the proof of the pathogenic nature of the entamoeba by producing amoebic dysentery experimentally in man. Cysts are the infective agents, and prophylaxis of the disease rests upon the discovery of "carriers" of the cysts. "A routine microscopical examination of the faeces should be as much a part of a clinical examination as the use of the stethoscope, the clinical thermometer, or the examination of the blood or urine."

The paper is illustrated by two plates of photomicrographs containing 13 figures.

H. B. F.

GAUDUCHEAU (A.). **Etude Comparative d'une Amibe de Culture et de Quelques Autres Formes Amibiennes Végétatives.** —*Bull. Soc. Méd. Chirurg. de l'Indochine.* 1914. July. Vol. 5. No. 7. pp. 293–304. With 1 plate.

The author considers that *Entamoeba phagocytoides* is a cultural amoeba. It was isolated by him in 1907 from dysenteric intestinal material. He has not yet seen in cultures a flagellate stage (see this *Bulletin*, Vol. 3, p. 78), and its generic name must be considered to be provisional. The amoeba adapts itself slowly at first to life in cultures. Modifications in the culture medium produce morphological variations in the amoeba. The cultural amoeba easily digests red blood corpuscles. It multiplies by budding under certain conditions. When the culture medium is nearly used up there is aggregation of the amoebae. These characteristics suggest that the organism is possibly a Myxomycetes. The spirilla threads previously seen in *E. phagocytoides* are identified as large flagella from bacteria in process of digestion. Some of the observed forms are intermediate between those of a strict Entamoeba and a cultural *limax*-like amoeba. In no case could the observed intermediate forms be considered to be degenerate. Foldings in the peripheral cytoplasm were sometimes seen suggesting transition between a pseudopodium and an undulating membrane. The author considers that members of the genus *Vahlkampfia* (cultural amoebae) can also live in the digestive tract and so are facultative parasites. He thinks that bacteria are the hosts of cultural amoebae, while red blood corpuscles, intestinal epithelium and liver are the hosts of Entamoebae.

In conclusion the author endeavours to show the relations which appear to exist between cultural amoebae and dysenteric amoebae on the one hand, and the Myxomycetes (Mycetozoa) on the other. There is a plate of 22 figures.

H. B. F.

SWELLENGREBEL (N. H.). **Dierlijke Entamoeben uit Deli (met Autoreferaat).** [Animal Entamoebae at Deli.]—*Geneesk. Tijdschr. v. Nederl. Indië.* 1914. Vol. 54. No. 4. pp. 420–426. With 1 plate.

The author, working at Medan, Deli, examined the faeces of an ape, *Macacus rhesus,* and of a sheep for entamoebae, and describes a new species from each.

Entamoeba chattoni is parasitic in the gut of *Macacus rhesus.* The amoeboid forms varied between $13\mu \times 12\mu$ and $12\mu \times 9\ \mu$, the cysts being 9μ or 8μ in diameter. Uninucleate and binucleate cysts only were found. They contained a glycogen vacuole.

Entamoeba ovis, from the gut of the sheep, was found as amoeboid forms varying between $14\mu \times 12\mu$ and $12\mu \times 11\mu$, and as uninucleate cysts, which contain extra-nuclear chromatin and a glycogen vacuole. The cysts are 8μ in diameter.

These points are illustrated in a plate of 31 figures.

H. B. F.

SMITH (Allen J.) & WEIDMAN (F. D.). **Further Note upon the Occurrence of *Endamoeba mortinatalium* as a Human Parasite.** —*Amer. Jl. Trop. Dis. & Prevent. Med.* 1914. Oct. Vol. 2. No. 4. pp. 256–259. With 1 plate.

The authors first found *Endamoeba mortinatalium* in 1910 in the kidneys, liver and lungs of a still-born foetus at term. Similar amoebae had been seen twenty years previously by RIBBERT in the kidneys of a syphilitic new-born infant and twice later in the parotid glands of non-syphilitic infants, and by JESIONEK and KIOLEMENGOLOU (1904) in the kidneys, liver and lungs of a syphilitic eight-months foetus.

In the material found by the authors in Philadelphia in 1910 the largest Endamoebae measured 38μ by 25μ, while the smallest were 22μ in diameter. Vacuoles were present. Pseudopodia, few in number, were short and thick. The pseudopodia were composed of ectoplasm, and there was a coarsely granular endoplasm. The nucleus was large, measuring one third to one half the diameter of the cell. It was rich in chromatin, containing a large karyosome and occasionally a centriole. There was a well-defined nuclear membrane. No associated bacteria were demonstrable.

Recently the organism has been found again in the lungs of a two-months old female child in the Philadelphia General Hospital. The child was syphilitic, and died from pneumonia.

"The pneumonia was of a peculiar type; the right lung being uniformly over the greater part of the whole organ consolidated and pale in a thin subpleural layer, while the central portion was deep red fleshy and nearly solid. Microscopically the red interior presented an irregular consolidation, with the vesicular walls thick from injection of their capillaries, marked cellular infiltration and swelling of the lining cells. Scattered vesicles were free from exudate and a number were filled with a highly albuminous fluid exudate which had been fixed as a hyaline content. For the most part, however, the vesicles contained, along with a minor amount of fibrin, a mixture of erythrocytes, a few polynuclear and mononuclear leaucocytes and many larger cells of embryonal connective tissue type. Mingled with these here and there the parasites were met, never in aggregations, and only sparsely scattered throughout the section. In the pale subpleural pneumonic area organization was advancing, the connective tissue cells appearing as fibroblasts; and an excess of formed

fibrous tissue was to be seen. Several small caseous foci in this area were found, never with the histology of definite tubercles; and special stains for tubercle bacilli failed to show the latter organisms. No other morphological changes, aside from widespread parenchymatous degeneration, were met; the intestines were normal to gross inspection."

It is considered that "it may be possible that a syphilitic infection may constitute a favouring circumference [*sic*] for infestment by these amoebae and their development and distribution in the body."

The plate represents a photomicrograph of a section of pulmonary tissue containing an *Endamoeba mortinatalium* 32μ by 20μ, with a nucleus of 10μ.

[An organism called *Amoeba pulmonalis* was found by ARTAULT in 1898 in the contents of a lung cavity. This parasite is not mentioned by Smith and Weidman. A detailed comparison of the forms would be interesting, if it were possible.]

H. B. F.

MATHIS (C.). **Réflexions sur Six Cas d'Hépatite Suppurée observés à l'Hôpital Militaire de Hanoï.** [Clinique d'Outre Mer].—*Ann. d'Hyg. et Méd. Colon.* 1914. Apr.-May-June. Vol. 17. No. 2. pp. 616–618.

Abscess of the liver is of frequent occurrence in Tonkin. In five months the author had six cases under his care. In five of these a dysenteric history was obtained and in the liver pus of all amoebae could be demonstrated. Attempts at cultivation of these organisms in sterile pus completely failed. A leucocytosis with diminution in the number of eosinophiles was found to be a constant feature. This reduction the author believes to be actual and, therefore, a characteristic and diagnostic feature of amoebic abscess.

P. H. B.

SAMBUC (Edouard). **La Pleurésie au Cours de l'Hépatite Suppurée.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon.* (1913). 1914. pp. 64–71.

The anastomoses of the lymphatic vessels between the pleura and the liver (especially on the right side) are responsible for the frequency of pleurisy in hepatic abscess.

As regards the pathogeny, the author considers these pleurisies classifiable according as they are the result of direct extension or metastatic in origin. Pleuritic effusions by direct extension were met with five times in 191 autopsies, but minor inflammatory conditions of the pleura (metastatic) were commoner, 15 per cent. in 100 clinical cases. In the former instance an empyema is the result of a direct perforation of the diaphragm, the bases of the lungs and the upper surface of the liver being matted together in a necrotic mass; on the other hand purulent pleuritic effusions found at autopsy without involvement of the diaphragm are very rare. An illustrative autopsy which came under the author's observation is given.

Large purulent effusions may occur and the hepatic abscess remain undetected or unsuspected during life; post-mortem a small communication may be found through the diaphragm. An example of this nature is given where the right pleura was entirely filled with purulent matter. In the majority of cases the empyema is localised

and shut off by adhesions in the neighbourhood of the base of the right lung. A pericardial effusion was found in 14 per cent. of autopsies for hepatic abscess.

Clinically these pleurisies may appear early or late in the course of the illness. Symptoms, such as a reappearance of fever or the occurrence of dyspnoea, should make the physician suspicious of some complication of the pleura. Finally it is of great importance that the pleura should be carefully watched after an operation for hepatic abscess, especially if the abscess was subphrenic. P. H. B.

MAURRAS & HERVIER. **Sur l'Anesthésie Locale Systématique dans les Opérations pour Hépatite Suppurée.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon.* (1913). 1914. pp. 106–110.

This paper contains a summary of the cases of hepatic abscess operated on at the Military Hospital, Saigon, during 1913 under local novocaine or stovaine anaesthesia. Out of thirteen cases (see MARTEL's paper below) nine, or 69 per cent., completely recovered. The authors make no pretence to have inaugurated this method, as it had been previously mentioned in the writings of BERTRAND and FONTAN. They employ a solution of 1 in 100 to which an addition of adrenalin, 1 : 1000, can be made if required. This is given hypodermically, but should resection of a rib be considered necessary a second injection must be made deep into the intercostal muscles and also under the periosteum.

Should a median or paramedian laparotomy be undertaken for an abscess pointing in the epigastric triangle, the liver can easily be exposed after a superficial and deep local anaesthesia has been effected; an interval of five minutes is allowed to elapse for the anaesthetic to take effect.

In hepatic abscess local anaesthesia has several advantages over general; the patients in this condition nearly always take a general anaesthetic badly and delayed chloroform poisoning is apt to occur. Besides, the authors think that even a moderate degree of chloroform poisoning acts as depressant and naturally decreases the resistant power of the body in lessening or absorbing the products of suppuration. If the local anaethesia has been well performed no part of the operation is attended by intolerable pain; the only part felt by the patient is the digital exploration of the abscess. Another objection which can be advanced is that local anaethesia limits the freedom of action on the part of the surgeon; the authors of this paper, on the contrary, have never felt any restrictions of this sort. In the series under consideration there were only two cases where the subsequent administration of chloroform became necessary. In the first case the patient refused local anaesthesia and in the second a too extensive operation had to be performed which would have necessitated the injection of too large a quantity of novocaine. Cases of hepatic abscess in the same hospital, which were operated on under general anaesthesia, only gave 60 per cent. of recoveries as against 69 per cent. of those operated on under a local anaesthetic.

Of the four fatal cases recorded, in three the abscesses were small and multiple, while the fourth was complicated by tubercular peritonitis. P. H. B.

LE ROY DES BARRES. **Notes sur un Point de Technique Opératoire dans l'Ouverture des Abcès du Foie par Voie Transpleurale.** *Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon.* (1913). 1914. pp. 105-106.

In a great number of cases, in the absence of any recent pleuritic adhesions, the transpleural operation for abscess of the liver is complicated by the creation of a pneumothorax, to avoid which it is usual to suture in an elliptical manner the pleura to the diaphragm. This preliminary suturing is not always easy to carry out, besides which the pleurae are very apt to tear. The author has found it much more advantageous to suture the membranes after the incision of the pleurae and diaphragm has been made. In order to do so two Kocher's clamps are placed on each side of the future incision, so as to embrace the pleurae and the diaphragm at the same time and an incision is rapidly made in a line joining the two clamps. The tissues on each side of these clamps can then be easily sutured with catgut. By these means one saves a great deal of time and only a negligible quantity of air can enter the pleural cavity.

It is advisable to resect a considerable length of rib, taking care to cover the resected portions with muscular tissue, so as to protect the bare bone from coming into contact with the pus and thus producing an intractable osteitis.

P. H. B.

MARTEL. **Emploi de l'Emétine à l'Hôpital Principal de Saigon. Sa Valeur Curative dans les Congestions du Foie et les Hépatites Suppurées d'Origine Dysentérique.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon.* (1913). 1914. pp. 31–43.

Emetine has been used therapeutically in dysenteric conditions in Saigon hospital since April, 1913. This communication deals with its effects in hepatic congestion and hepatic abscess, especially after operation. The results were specially encouraging in cases of hepatitis suggesting a commencing suppuration.

Emetine was given in doses of 6, 8 and 10 centigrammes over a period of six to ten days; under its influence the clinical symptoms ameliorated and the leucocyte count rapidly became normal.

A clinical record of eight cases is given to illustrate the author's contentions. His estimation of the value of emetine in post-operative treatment is based on thirteen cases, nine of which were completely cured and four died. These nine successful cases encourage the author n the belief that eight centigrammes of emetine given daily over a period of eight to fifteen days exert a very favourable action, hasten the cicatrization of the abscess and its final cure, and improve the patient's general condition; at the same time one cannot deny that fresh hepatic abscesses sometimes form while the patient is under the influence of the drug; this occurred in two of his cases.

The percentage of successful cures of cases operated on for hepatic abscess in Saigon varies very much from year to year; during 1913 69 per cent. of a series of thirteen cases were cured; this is the highest percentage of recoveries and the smallest total number of cases recorded since 1906. The author wonders whether this beneficial result is entirely due to emetine.

P. H. B.

Bacillary Dysentery.

Denier. **La Dysenterie à Saigon.**—*Far East. Assoc. Trop. Med. C. R. Trois Congrès Biennal. Saigon.* (1913). 1914. pp. 25–31.

The dysentery stools passed in the military hospital at Saigon were systematically examined at the local Pasteur Institute during the year 1914; the present paper deals with the results. By these means the author was able to demonstrate that bacillary dysentery is widely spread and to determine at what season of the year the disease was most prevalent. A detailed statement of the technique employed in the investigation of the stools is given, as the author considers that in order to make just comparison with the results of others it is essential to utilise similar methods. It is as follows:—

Directly a patient suffering from any intestinal complaint is admitted to the military hospital the Pasteur Institute is advised by telephone; thereupon a sterilised receptacle for the stool is immediately despatched. The examination of the stool is commenced within 30 minutes of its being passed. In addition to the microscopical examination of the fresh specimen several smears of the mucus are fixed by the Bouin-Dubosc method and stained with haematoxylin.

For the isolation of the dysentery bacillus the Conradi-Drigalski medium has been found unsatisfactory. For various reasons the author reverted to plain litmus lactose agar and was able to obtain more satisfactory results. Colonies of bacilli which retain a blue colour after 36 hours of incubation are selected, inoculated into broth and into a peptone-water solution of the various sugars and finally agglutinated against antisera prepared by injections of rabbits with killed cultures of Shiga-Kruse, Flexner, "Saigon," and Strong's dysentery bacilli obtained from the stock cultures of the Pasteur Institute in Paris. The litmus media were prepared throughout with the kahlbaum tincture.

Observation conducted on these lines commenced on the 28th of May and terminated on the 31st of October, though interrupted for one month (from the 24th of August to the 22nd of September) on account of the shortage of the various sugars employed.

During the year dysentery in Saigon itself was of a very benign type, though much more virulent at Cape Saint Jacques during the months of May and June. No fewer than 329 stools were examined during the period under review. Dysentery of bacillary origin was found to be of most frequent occurrence during the months of June and July. Out of the total number of dysenteric motions bacilli were isolated in 30·48 per cent. and from diarrhoeic stools in 17·72 per cent. Bacilli and amoebae were frequently found associated. Of the classifiable varieties of specific bacilli Shiga bacillus was obtained in 37·68 per cent., Flexner in 11·59 per cent., bacillus of Hiss in 23·18 per cent. and "Saigon" in 27·52 per cent. The several varieties of dysentery bacilli were isolated on some occasions from the same stool.

P. H. B.

Heffernan (P.). **Asylum Dysentery.**—*Indian Med. Gaz.* 1914. Nov. Vol. 49. No. 11. pp. 417–424.

Bacillary dysentery has proved to be the scourge of lunatic asylums in India, as indeed has long been the case in similar institutions in

Europe. At the outset of this paper the author, who is Superintendent of the Madras Lunatic Asylum, gives certain pertinent statistics as to the prevalence of this disease in certain of the newly designed asylums of India, where no suspicion of the sanitation or of the water supply can possibly be entertained. The continued existence and spread of the infection can only be explained by the supposition that certain individuals act as carriers of the infection. Dysentery accounted for 11·96 per cent. of the total deaths in the lunatic asylums of Bengal during 1912. The questions the author touches on in his paper are the following :—

"(1) Is asylum dysentery in India identical with the bacillary dysentery of the English asylums, and if the diseases are not identical, in what does the difference consist ?

"(2) By what measures may we hope permanently to eradicate the disease from the Indian and English asylums ?

"(3) What is the best treatment for individual cases of the disease, in India and in England, with which we are acquainted ? "

The author endeavours to answer these questions by means of a brief analysis of the dysentery cases which have occurred in the Madras Asylum during the past three and a half years. The incidence rate was calculated according to the method employed by Dr. Sidney COUPLAND, that is, the percentage of attacks in proportion to the average number resident during the year.

According to this method there were 197 attacks of dysentery during the forty-four months under review and the yearly rate works out at 9·5 per cent. of the daily average number of patients resident. The mortality amongst those attacked was 19·8 per cent. The longest stay of any patient in hospital was 128 days, the shortest one day. The stools were examined microscopically in every case, and the bacilli were isolated at the King Institute of Preventive Medicine, Guindy, where autogenous and polyvalent vaccines were prepared.

It was found quite impossible to isolate dysentery bacilli from faeculent stools, but only from the freshly passed mucus. Bacilli were isolated in this manner in 50 per cent. of the total number of cases.

Experience suggests to the author that the isolation of dysentery bacilli from the stool is of little value in the diagnosis of the disease, as if the stools are kept for any considerable time before plating, or if anything but well washed and freshly passed mucus is used, a negative result may be expected.

As regards the diagnosis, the author considers that acute cases with fever lasting about three days in individuals who have not previously suffered from dysentery are almost certainly bacillary, and the success or failure of emetine treatment is of little use from a diagnostic point of view except in cases where the ordinary forms of treatment have been tried and have failed and where emetine succeeds. The *Amoeba histolytica* was present only in five cases ; of these, three were Europeans and one an Indian lately returned from Singapore. Three cases in whose stools *Balantidium coli* were present proved rapidly fatal.

Prophylactic measures against this type of dysentery consisted of :—

(1) The treatment of all dysentery cases in isolation sheds.

(2) The segregation and observation of convalescents for six months after recovery. . . .

(3) The incineration of the excreta of all dysentery patients and of convalescents.

(4) The boiling of drinking water.

(5) Prophylactic inoculation of all patients exposed to infection.

Of these the last measure calls for special attention. Prophylactic inoculation was commenced in November and December, 1913, when 533 patients were inoculated, the vaccine being prepared from Shiga and Flexner strains isolated from the stools of previous cases. The emulsion was made up to a strength of 100 million dead bacilli per cc. Two inoculations of 200 millions each were administered at a 10–14 days interval. The consequent reaction was extremely slight and occurred chiefly in individuals who had previously suffered from dysentery. In six cases a localised and sterile tissue necrosis occurred. The results of this inoculation during 1913 from the prophylactic point of view have been disappointing.

The pathology of this asylum dysentery is dealt with in a summary of 1,167 post-mortems made during the period under review. In 20·4 per cent. dysenteric lesions of the bowel were present, in 15 tubercular ulcers, but in no single instance were liver abscesses present.

Medicinal treatment consisted in the administration by the mouth of ℥ss-℥j of castor oil, together with boric acid, albargin (grs. 4 to the pint) and potassium permanganate rectal lavage; it was found advisable to leave the solutions in the bowel as long as possible, for which purpose the foot of the bed should be raised on blocks 18 inches high.

Serum treatment was tried with encouraging results in a limited number of cases, so far with good results. The impression left as a result of this trial is that serum is of benefit in acute febrile cases, but that its effects are transient and that several doses are required to produce any permanent effect on the disease; the great expense of the serum practically rules it out in asylum practice as a routine measure. An interesting point and one worthy of serious study and investigation is the observation that many of the Madras cases developed glossitis or stomatitis during the course of their illness. The stools became frothy, copious and very offensive—in fact very like those of sprue. At the post-mortem examination in these cases there was great attenuation of the alimentary canal and denudation of epithelium.

Inoculation as a therapeutic measure with polyvalent or autogenous vaccine was tried in 1911 in 37 cases, but the results were not encouraging, though one must note that the most unfavourable cases were the subjects.

The paper closes with a reference to the difficulties in the prophylaxis of dysentery which a superintendent of such an asylum has naturally to contend against amongst unclean and insane natives. At the conclusion of the paper there are appendices containing statistics to which frequent reference is made in the text.

P. H. B.

KUENEN (W. A.). **La Dysenterie Bacillaire chez les Coolies à Deli.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon.* (1913). 1914. pp. 54–62.

The mortality rate of dysentery in Deli (Sumatra) has considerably decreased during the last ten years. In 1901 it was computed to be

50 per cent., while during the last few years it has oscillated round the figure of 10 per cent. Of this death-rate the amoebic variety appears to be responsible for about four-fifths. According to Drs. SCHUEFFNER and BAERMANN bacillary dysentery appears to have been imported from Java and to have spread in epidemic form. The figures for about 10,000 coolies are as follows :—

In 1909	Deaths	149.	Amoebic	Dysentery	28.	Bacillary Dysentery	21
,, 1910	,,	121	,,	,,	10	,, ,,	14
,, 1911	,,	167	,,	,,	16	,, ,,	36
,, 1912	,,	109	,,	,,	11	(Shiga's bacillus 1 Y bacillus 10)	13
,, 1913	,,	120	,,	,,	9	(Shiga's bacillus 2 Y bacillus 21)	24

Under the heading of *bacillary dysentery* are included all cases showing a diffuse inflammation of the intestinal canal in which amoebae are not present. For isolation of the specific bacillus the author uses a medium called Endo coloured by fuchsine, on which the *coli* colonies take on a bright red colour. He considers that various micrococci and colon bacilli as well as Cercomonads and Trichomonads may play a part in the pathology of the disease.

According to the author's ideas, as well as those of LEVY, KOLLE and HETSCH, it is necessary to separate the disease caused by the Shiga-Kruse bacillus from other dysenteries. There are valid reasons for this separation—bacteriological, clinical and epidemiological.

The Shiga-Kruse bacillus is found throughout the whole world; it gives certain definite sugar reactions and in broth produces a toxin which has a definite specific action on experimental animals. It produces in man the disease known as epidemic dysentery. The *pseudo-dysentery* bacilli acidify maltose and mannite in addition to glucose, though there are intermediate types; for instance, one has been isolated ten times during the last four years which acidifies maltose and glucose but not mannite, and agglutinates only slightly with Shiga-Kruse and "Y bacillus" immune serum, while agglutinating in high dilutions with its own immune serum. This new type the author has called "Van der Bosch." None of the pseudo-dysentery bacilli form toxin in broth as does the Shiga-Kruse bacillus. The number of pseudo-dysentery bacilli can be augmented almost indefinitely. Type "Y" ferments mannite alone; type Flexner, mannite and maltose—or maltose alone (type "Van der Bosch").

According to the author's experience sub-varieties of pseudo-dysentery bacilli are of little significance. The fermentative powers of even the same strain of bacillus are extremely variable. If a colony of bacillus "Y" is plated out, bacilli can be isolated which ferment maltose only with difficulty and even some which give the reactions of the true Flexner.

The clinical symptoms evolved in man by bacilli of the pseudo-dysentery group are certainly less severe than those of epidemic dysentery, but nevertheless they cause a high percentage of deaths in Deli; for instance, in 1913, 20 per cent. of the total number due to bacillary dysentery.

As regards the pathological lesions caused by these types of bacilli no appreciable differences can be detected. As regards treatment the author considers that the antitoxic serum exerts often a remarkable

action in epidemic dysentery, but it should be given as early as possible, that is to say before a diphtheroid membrane has formed, extensive enough to endanger the life of the patient.

The serum prepared in the pathological laboratory at Medan by injecting a horse with Shiga-Kruse bacilli has remarkable bactericidal properties and appears to act equally well in cases of pseudo-dysentery.

P. H. B.

De Sautelle (W. T.). **A Case of Bacillus Dysenteriae Septicemia.** *Jl. Amer. Med. Assoc.* 1914. Nov. 21. Vol. 63. No. 21. p. 1853.

Instances of the isolation of *B. dysenteriae* from the blood during life have seldom been recorded; therefore the case described in this paper is of exceptional interest.

The patient was a three-weeks-old breast-fed infant with a temperature of 103°. There was no diarrhoea, but meningeal symptoms were present. From blood extracted from the toe, as well as from a lumbar puncture, *B. dysenteriae* was isolated in pure culture. Previous to this a tentative diagnosis of typhoid fever had naturally been made from the fact that the grandmother of the infant was suffering in the same house from *B. typhosus* septicaemia.

The reactions given by this dysentery organism differed in minor details only from the typical Flexner bacillus.

The source of infection could not be ascertained.

P. H. B.

Musgrave (W. E.) & Sison (A. G.). **Bacillary Dysentery: the most Prevalent Form in Manila and its Treatment.**—*Philippine Jl. of Sci.*, Sect. B. Trop. Med. 1914. June. Vol. 9. No. 3. pp. 241–251.

During the past decade it has been conclusively shown that the dysentery group of organisms is world wide in its distribution, though the types of bacilli and the clinical varieties of the disease they give rise to in different localities appear to vary considerably.

In the Philippine Islands bacillary dysentery is endemic at all times and is due to at least three types of the organism—the well known types of Shiga and Flexner and the lesser known type of Morgan, which appears to have been the predominating cause of the recent epidemic in the Islands, though in and about Manila, where the cases were more scattered, organisms of the Shiga and Flexner types were found.

During the year 1912–1913 there came under the notice of the authors 266 cases of acute colitis, of which 191 were in males and 75 in females; both the case incidence (67 cases) and the mortality rate (9 per cent.) were found to be highest during the first five years of life. The average death rate from this cause, as compared with statistics given for other countries, appears to be extremely low. In the majority of cases (61·6 per cent.) the colitis was associated with other diseases, such as pulmonary tuberculosis (18 cases) and worm infections, such as *Ascaris lumbricoides* and *Trichuris trichiura*.

Complications, though not all due to the influence of the dysentery bacillus, were found in 30·1 per cent. of the cases; these ranged from acute nephritis (13·9 per cent.) to acute splenitis (0·4 per cent.).

The prophylaxis of bacillary dysentery is referred to in general terms; it is interesting to note that flies are considered to be the main disseminators of the disease in the Philippines. The routine treatment in the Philippine General Hospital is as follows:—Some mild laxative, preferably sodium or magnesium sulphate, is administered early and is preceded by minute doses of calomel, while *Simaruba officinalis* combined with some opiate is highly recommended and is considered to have given the most satisfactory results in comparison with other drugs. As an adjuvant normal saline enemata, and later when the acute stage has subsided, similar injections of hydrogen peroxide in a weak solution (25 cc. in 500 cc. water) are considered advisable. The use of ipecacuanha even when combined with opium in the form of Dover's powder or that of the usual astringents and gastro-intestinal antiseptics, such as bismuth, tannic acid, salol, and betanaphthol is not recommended. The essential part of the treatment is considered to be the dietetic; during the first acute stages food must be withdrawn and pieces of crushed ice given to allay the thirst. It is essential that the mouth be frequently cleansed with an antiseptic mouth wash to prevent the complications of parotitis and gastritis.

It is noteworthy that for practical purposes, in places where the means of identifying the infecting micro-organisms are not available, treatment by polyvalent serum fails. This experience of the authors, which is entirely opposed to that of other investigators of the disease, is ascribed to the important rôle played by other micro-organisms, such as staphylococci and colon bacilli, in producing the inflammation of the intestinal mucosa.

P. H. B.

CANDIDO (G.). **Piocianasi Dissenterica.** [Dysentery due to *B. pyocyaneus*].—*Ann. Med. Nav. e Colon.* 1914. Oct.-Nov. Ann. 20. Vol. 2. No. 4–5. pp. 337–351. With 1 chart & 4 figs.

An account of a case of dysentery in which *B. pyocyaneus* was recovered in pure culture from the stools.

The patient was a sailor belonging to the Italian Navy, who entered the naval hospital at Taranto for the purpose of having a routine examination made of his stools for cholera vibrios, on his return from foreign service. For one or two days previous to entering the hospital the patient had stayed at an inn where he had partaken of oysters. On entering the hospital the bowels were normal, but on the fourth day the patient was seized with sudden colic and diarrhoea, together with a rise of temperature. The stools, which were very frequent and passed involuntarily, consisted of a greenish liquid mixed with mucus and blood. There was much loss of strength and great emaciation. The patient recovered after an illness of 40 days' duration, the temperature coming down to normal on the 12th day. *B. pyocyaneus* was recovered in a state of purity from the stools, and was easily identified by cultural and other tests. Some general observations, and a bibliography of the condition, are appended. The oysters are suspected to have been the cause of infection.

J. B. N.

Flagellate Dysentery.

Escomel (E.). **Un Nouveau Traitement de la Trichomoniase Intestinale.**—*Bull. Soc. Path. Exot.* 1914. Nov. Vol. 7. No. 8–9. pp. 657–660.

The author writes from Arequipa, Peru, regarding his treatment of intestinal trichomoniasis, of lambliasis and of amoebiasis.

(1) He recommends for trichomoniasis the use of an aqueous solution of iodine, 1 per 1,000, as an enema. The water used for solution need not be boiled, as a moment after the addition of the iodine it becomes sterile.

The enemata should be given slowly each evening for three consecutive days, using one litre each time. Before the iodine enema, one of boiled water should be given. The patient should be placed on a farinaceous diet, with rice water for drinking.

Usually the Trichomonas disappear from the stools on the second day of treatment, and the cysts on the third day. If, as in rare cases, Trichomonas are still found in the stools on the fourth day, it indicates that the Protozoa have invaded the deeper and higher zones of the intestinal mucosa. In such cases it is necessary to apply the following treatment.

Emulsion de Franck*	120 gm.
Elixir parégorique	4 à 6 gm.
Essence de térébenthine.. ..	2 à 4 gm.
Julep gommeux	30 gm.

A spoonful of the mixture every two hours for the first three days.

And morning and evening:—(1) An enema of 2 litres of decoction of eucalytpus; (2) a second enema of 60 gm. of boiled water, yolk of an egg, 10 drops of laudanum and 15 drops of essence of turpentine. Rest, an exclusive carbohydrate diet, and warm fomentations on the stomach. The treatment is to be continued until no stages of tricho-

*The prescription has been thus transcribed by Mr. P. H. Marsden, Lecturer in Materia Medica and Pharmacy, in the University of Liverpool, into a form which may be readily prepared by a British pharmacist:—

Julepo do Dr. Franck	Infusi Cinchonae (1 in 50, not acid) ..	72	grams.
	Extracti Cinchonae	11	,,
	Tincturae Cinnamomi	20	,,
	Syrupi Opii (0·5 Ext. in 1,000) ..	14	,,
	Tincturae Camphorae Compositae	5	,,
	Olei Terebinthinae	3	,,
Potion gommeuse vel Julep gommeux	Gummi Acaciae	2	,,
	Aquae Floris Aurantii	2	,,
	Aquae Destillatae	20	,,
	Syrupi	6	,,
	Mistura fiat		

The dose would be probably a tablespoonful, the common French dose for mixtures.

monas occur in the stools. [Compare this *Bulletin*, Vol. 4, p. 317 and Vol. 1, p. 719]:—

(2) For patients affected with *Lamblia intestinalis* he recommends:—On the first day a milk diet (3 to 4 litres of milk); on the second day 0·4 to 0·6 cgm. of calomel after fasting, and half an hour afterwards 45 gm. of aromatic castor oil. Strict milk diet. On the third day the parasites should have disappeared.

(3) For intestinal amoebiasis the author uses injections of emetine until all stages of the amoebae have disappeared from the stools. Hepatic amoebiasis is common at Arequipa, with or without previous dysentery, due to the daily taking of much spice (capsicum) with the food. Congestion of the rectum and liver is thus produced which is favourable to the development of ingested amoebae. From the rectum the amoebae may penetrate the veins and reach the portal system. ROGERS's treatment, namely, repeated injections of emetine and puncture of the liver abscess, has given good results.

H. B. F.

WRIGHT (J. M.). **Balantidium coli.**—*China Med. Jl.* 1914. July. Vol. 28. No. 4. pp. 259–260.

This short paper begins with a description of the Ciliate, *Balantidium coli*, and continues with quotations from BRAUN, DANIELS, STITT and MANSON on its occurrence and pathogenicity.

The author, writing from Takhing, China, states that he has found the parasites in apparently healthy individuals. In no case could the infection be blamed for any of the symptoms. The parasites have been kept alive in infected fecal specimens for 10 to 94 days.

The author concludes that "if there exists a disease of the lower bowel, one can easily imagine harm that they (the Balantidia) might do."

H. B. F.

MIXED AND UNCLASSED DYSENTERY.

SANDWITH (F. M.). **The Lettsomian Lectures on Dysentery. Delivered before the Medical Society of London, 1914. Lecture I. The History of Dysentery. Lecture II (Part I). Amoebic Dysentery. Lecture II (Part II). Diagnosis of Amoebic Dysentery. Lecture III. Bacillary Dysentery.**—*Lancet.* 1914. Sept. 5. pp. 637–642; Sept. 12, pp. 683–687; Sept. 19, pp. 731–736; Sept. 26, pp. 783–789.

These lectures, written as they are in a bright and scholarly style, certainly constitute one of the fullest accounts of the history, etiology and treatment of dysentery which has appeared of recent years. It is difficult on that account, and also since they contain little in the way of experimental work which has not been printed elsewhere, to compose an adequate review of them in a short space.

The first lecture consists of a resumé of the history of dysentery, especially with reference to the knowledge gained in the last thirty-three years, that is since Sir Joseph FAYRER delivered the Lettsomian

lectures on the same subject. The first part of the second lecture deals with the life history and morphology of the Entamoebae found in man and in this connection full credit is given to WALKER and SELLARDS for their recent work, in which by means of experiments on human beings they showed conclusively that the encysted forms of the two human entamoebae are the infective agents, and that while one is pathogenic, the other is harmless to man [see this *Bulletin*, Vol 3, p. 63].

In the diagnosis of amoebic dysentery Dr. Sandwith lays stress on the necessity of examining the stools daily for amoebae and the inadvisability of relying upon one negative examination. He considers that no naked eye examination of the faeces can be trusted to determine whether the patient is suffering from amoebic or bacillary dysentery, although he thinks a shrewd guess may be made in this direction: in amoebic cases the mucus is generally of a deep red colour, purulent and not unlike the liver pus.

The importance of washing stools to ascertain the presence of sloughs or masses of mucus, a method much neglected in English hospital practice, is commented upon.

The second part of the second lecture is mainly concerned with the treatment of amoebic dysentery and contains a concise and practical account of the history of treatment both by emetine and by ipecacuanha. Here the suggestion is made of serving out as a routine measure emetine tabloids to plantation coolies who are attacked by diarrhoea or dysentery—a valuable practice which should be universally adopted.

That emetine is not always successful in saving the lives of amoebic dysentery patients is shown by the case of a Japanese fireman under Dr. Sandwith's care who died after comparatively large doses of the drug and after a twelve days' stay in hospital. As a subsidiary agent Dr. Sandwith is a great believer in bismuth, given as a subnitrate in doses of from fifteen to sixty grains four-hourly.

The third lecture deals entirely with bacillary dysentery and considerable space is allotted to the discussion of asylum dysentery, which by the figures given appears to be still alarmingly frequent in the lunatic asylums of this country and which Dr. Sandwith considers is of bacillary origin. In the paragraph on treatment due attention is given to the injection of a polyvalent antiserum especially in heroic doses.

P. H. B.

SCOTT (L. Bodley). **The Nature of Jail Dysentery.**—*Indian Med. Gaz.* 1914. July. Vol. 49. No. 7. pp. 269–270.

The Sylhet jail, like many other jails in Bengal and Assam, regularly has a high admission rate for dysentery. Facilities for bacteriological tests not being available, it was decided to apply the test of treatment in order to settle whether the dysentery of the jail was amoebic or bacillary in nature. In April, 1913, a dysentery register was opened and all prisoners admitted to hospital for this disease were entered n the book as they came. Without selection of any sort alternate

cases on the list were treated with hypodermic injections of emetine, the remainder by the older methods such as ipecacuanha (grs. 20 to 40), sodium sulphate (1 drachm every three hours), while a few received samples of some new drugs—*Ixora cocci* or an extract of *Holorrhena liquidum* which had been sent for trial by the Indigenous Drug Committee. In the register were recorded over a period of ten months the treatment of each case and other details such as the number of days in hospital, the number of daily stools, etc. Of 254 cases eight died, giving a mortality of 3·15 per cent. From the tables as compiled there were found to be no very striking differences between the results obtained from the various drugs, though there was a slight balance in favour of the saline treatment. The main point is that emetine gave no better results than other forms of treatment, thereby suggesting that the type of dysentery under observation in this jail was not of amoebic origin.

[The experience of the author of the paper, though his conclusions were obtained by a rather crude method, the therapeutic test, seems to agree with that of other investigators on epidemic dysentery in native jails, which is nearly always of bacillary origin, the amoebic cases being rarer and of a more sporadic occurrence.]

P. H. B.

Grall (J.) & Hornus (P.). **Coprologie des Dysenteries, Diagnostic Différentiel Macroscopique.**—*Paris Med.* 1913–14. June 13. Vol. 4. No. 28. pp. 51–58.

The observations on which the paper is based were made in the Military Hospital at Casablanca, where the authors have had the opportunity of studying from day to day numerous bacillary and amoebic dysenteric stools.

As a routine measure every patient exhibiting dysenteric symptoms was first put to bed and placed on a milk diet; then by means of a special apparatus placed in the latrines the stools were collected quite free of and uncontaminated by urine and were afterwards examined microscopically; in addition the agglutinative powers of the serum were tested against a suspension both of Shiga's and of Flexner's bacilli.

In this manner 465 patients were duly examined. Of these 86 stools could not be classified, 32 were diarrhoea of dysenteric origin, while 104 contained amoebae and from 234 dysentery bacilli were isolated; of the bacillary cases three quarters were due to Shiga's, the remaining one quarter to Flexner's dysentery bacillus. Observation showed that all stools of a dysentery nature passed through two stages (*a*) a sero-mucous and (*b*) a faecal stage, and that furthermore the mucus passed per rectum could be classified according to its consistency and colouration. The green colour of the mucus in all cases would appear to be due to the presence of unconverted biliverdin, but when dyed with red or pink the colour is due to the presence of red blood corpuscles.

The authors find that the mucus from amoebic cases had distinctive characteristics; it is white and glairy, like the white of an unboiled egg, streaked with blood, contrasting with the green bile-stained mucus, and often swimming in a yellow serous fluid.

As a result of their work they have been enabled to draw up a rational classification of dysentery and its varieties as follows :—

	Green mucus with aggregations of bacteria.	Superficial catarrhal inflammation of the ileocaecal region by pathogenic micro-organisms.	Dysenteric diarrhœa.
Mucus partly red and partly green.	Red mucus with aggregations of leucocytes.	Necrotic ulceration of the sigmo rectal tract by the dysentery bacilli.	Bacillary dysentery.
	The red elements extremely rich in masses of leucocytes.	Catarrhal inflammation and ulceration of the ileocaecal region by the dysentery bacilli and usual organisms.	
	The red elements enclosing scattered masses resembling pus.	Catarrhal inflammation and ulceration of the ileocaecal region by the action of microorganisms and pathogenic amoebae.	Amoebic dysentery.

To sum up, the macroscopic examination of the dysenteric mucus is a very rapid and simple procedure, and it is the authors' contention that by the light of their investigations it is a valuable indication as to the nature or the seat of the dysenteric process.

[The macroscopic appearance of a dysenteric motion is apt to be influenced by so many factors—i.e., nature of the food, age, race of patient, the length of time since passed, etc.—that undoubtedly the majority of investigators are able to place little reliance on it as an aid to diagnosis.]

P. H. B.

DENIER. **Etat des Malades atteints d'une Affection Intestinale, dont les Selles ont été examinés à l'Institut Pasteur de Saïgon pendant les Mois d'Octobre et Novembre 1913.**—*Ann. d'Hyg. et Méd. Colon.* [Clinique d'Outre Mer]. 1914. Apr.-May-June. Vol. 17. No. 2. pp. 585–588.

This paper consists merely of tabulated returns of microscopical laboratory examination of stools during the months of October and November, 1913. The stools are classified according to whether they consisted mostly of mucoid or faeculent matter.

In October, 1913, in mucous stools amoebae were found in 60·86 per cent., dysentery bacilli in 8·69 per cent., while a negative result was recorded in 30·43 per cent. ; in the faeculent stools on the other hand 27·77 per cent. were found to contain amoebae, and 11·11 per cent. dysentery bacilli. The month of November, 1913, showed a higher proportion of bacillary cases ; in the mucoid stools bacilli were found in 13·04 per cent., amoebae in 47·82 (a slightly lower proportion than in October). Of the faeculent stools 18·18 per cent. contained amoebae and 9·09 per cent. dysentery bacilli. [See also this *Bulletin*, Vol. 3, p. 46].

P. H. B.

HEBBERT (R. F.). **The Treatment of Dysentery.** [Correspondence]. —*Indian Med. Gaz.* 1914. Sept. Vol. 49. No. 9. pp. 371–372.

Captain Hebbert's experience of the treatment of dysentery in India would appear to be an exceptional one. In his hands the pure magnesium sulphate treatment has proved very successful but not in every instance; in some it appeared to produce a severe spasm of the iliac colon, the occurrence of which he seems to have avoided by the administration of 30 minims of camphorodyne at night, followed by a drachm of magnesium sulphate given hourly during the day time. With this routine he has failed in two cases only to get rid of all blood and mucus from the stools in under the week.

It is surprising that contrary to the experience of Indian practitioners in general he has so little faith in ipecacuanha and considers a negative examination of the stools as far as amoebae are concerned of little value. He is of the opinion that when the colon is very acutely inflamed, perhaps from some local ulcer, a severe spasm ensues which prevents the complete flushing of the large intestine. This, he thinks, is to a large extent prevented by the camphorodyne.

P. H. B.

SPRUE.

DISTASO (A.). **Sur l'Etiologie de la Sprue.**—*Bull. Soc. Path. Exot.* 1914. Apr. Vol. 7. No. 4. pp. 268–270.

A bacteriological examination of the stools of a patient suffering from sprue showed on Drigalski's medium scanty colonies of *Bacillus coli* and a large number of colonies belonging to the *Lactis aerogenes* and Friedlander's bacillus group. The members of the latter group produced acid and gas in glucose, lactose, mannite, raffinose and levulose, but had no action on saccharose, dulcite and salicine. They had no motility and they produced acid and gas in neutral red agar while indol appeared in a tryptophane medium. A vaccine was prepared from this organism and an injection was given to the patient, followed by another seven days later. After this the symptoms of the disease disappeared, diarrhoea giving way to constipation. Up to the time of writing there had been no relapse and the author believes that the case is completely cured. He draws attention to the fact that with the amelioration of the symptoms the flora of the intestine took on the aspect of that of a normal individual. He proposes to name the bacillus the *Bacillus spruae.*

[One should like some more details as to the colour and other aspects of the faeces and the general condition of the patient before coming to the conclusion that this was really a case of cure.]

G. C. Low.

ASHFORD (Bailey K.). **Clinical Notes on a Case of Sprue.**—*Bol. Assoc. Méd. de Puerto Rico.* 1914. May. Vol. 10. No. 98. pp. 10–12.

This is a well-written and particularly well expressed account of a case of sprue occurring in an American gentleman in Porto Rico. The shining tongue and distended abdomen, the large, evil smelling, grey or amber coloured stools left the diagnosis hardly in doubt.

An experimental trial of emetine hydrochloride by subcutaneous injection proved to be a failure, nausea was thereby induced and its administration had to be discontinued. Next an attempt was made with tincture of nux vomica on the lines laid down by Carnegie BROWN, combined with gambir-agar to combat the atrophic enteritis. Under this treatment improvement was noted, but one night without any previous warning a severe gastric haemorrhage occurred, although no sign or syndrome of gastric ulcer had ever presented itself and the gastric juice had been proved to be almost entirely deficient in hydrochloric acid. After this occurrence the patient was placed on a strict milk diet with ever increasing quantities of fresh strawberries which had to be secured from the United States (his monthly diet costing him over $130). Beginning with 2,000 grammes of milk a day he reached in a period of three weeks a total quantity of 4,000 grammes.

A decided improvement manifested itself almost immediately, so fresh vegetables and fruit, especially the pawpaw, were added. In two months he had sufficiently recovered to enable him to take up his heavy official duties.

P. H. B.

WILLIAMS (C. E.). **A Case of Sprue.**—*Med. Jl. of Australia.* 1914. Nov. 28. Vol. 1. No. 22. pp. 519–520.

This is a record of sprue occurring in a sugar planter, aged 56, in Queensland. There was nothing remarkable about the appearances and clinical symptoms of what appeared to be a typical case. On a purely milk diet, increasing to as much as seven or eight pints of milk per diem, together with juice of pears, grapes, oranges, and mangoes, especially the latter, great improvement and a corresponding increase in the body weight of the patient took place. Within a period of four months a total increase of 51 pounds was registered. After six weeks' treatment other ingredients, such as custard, baked apple, beef tea, and soft milk pudding were added to the diet. No medicines were given, save an occasional dose of castor oil and 3 minims of cinnamon oil in gelatin capsules as a carminative and intestinal antiseptic.

[The main interest is the record of an authentic case from Queensland where, according to the author, the disease appears to be not uncommon, though as he remarks it is less often recognised in patients who, having previously resided in the north, develop symptoms in the southern states.]

At the end of the paper the author makes some very pertinent remarks as to the management of a case of sprue; he says, and very wisely too, that experience has taught him never to undertake the treatment of a case of sprue except in a hospital, or if in a private house then only with the help of a trained nurse who has full charge of the patient. There is no absolute rule as to the dieting of cases; as to the exact quantity and nature of the food individual experience alone can tell; any article of diet which disagrees must immediately be stopped. Personal supervision of the diet is the main and most vital part of the treatment; written instructions are worse than useless and all drugs quite ineffective. He remarks a trait of sprue patients with which every practitioner who has seen several cases is familiar, namely, the readiness with which they religiously follow their instructions in regard to medicines, which are at the best but placebos, but disregard entirely instructions as to diet, a very important and to them a vital matter.

Of the fruits available the author is inclined to recommend the strawberry and the mango as being the most suitable, as well as the most efficacious. Finally, when the patient is living on a liberal diet, it is most necessary, in order to prevent recurrence of symptoms, to omit those articles of diet which are usually recognised as being indigestible, such as pastry, pork, pickles, meat twice cooked, etc. As regards the etiology of sprue the author has little to say, save that in Queensland the cases seem to originate chiefly in two or three centres. It is fairly prevalent, though not to such an extent as in districts further north. He thinks that the nature of the dietary or of the water supply has little to do with the causation or spread of the disease, the symptoms of which suggest some alteration of the intestinal flora with a consequent catarrh of the mucous membranes, a denudation of the epithelium and of the glandular and other structures, and finally toxaemia from the absorption of the intestinal products of fermentation leading to anaemia and pigmentation comparable to what obtains according to LANE's theory of intestinal stasis.

[It is to be noted that Williams expresses views similar to those of the reviewer, who has incriminated, though not actually convicted, some species of yeast fungus (Monilia) as being the organism mainly concerned in the production of this excessive intestinal fermentation.]

P. H. B.

HIATT (H. B.) & ALLAN (W.). **Notes on Cases of Sprue invalided from the Tropics; will it become Endemic here?**—*Jl. Amer. Med. Assoc.* 1914. Aug. 1. Vol. 63. No. 5. pp. 395–397.

The authors fear that the recent American invasion of Porto Rico, an island where sprue is very prevalent, and the numbers of American residents who have returned home after contracting the disease may —should sprue be, as the authors suspect, an infectious disease—lead to its dissemination throughout the Southern States. As evidence of the contention they point to the rapid spread of pellagra in these states during recent years.

They base their description of sprue, which does not differ from the very familiar text book accounts, on three cases from Porto Rico, two from China, and one case in a white woman, a resident since birth in North Carolina, which from their description of clinical symptoms appears to be a typical instance of the disease.

Having had a large experience of pellagra they are quite unable to support the contention of STUART, BURNET, JACKSON and others that pellagra and sprue are virtually one and the same disease.

P. H. B.

ROGERS (Leonard). **Two Cases of Sprue treated by Mouth Streptococcal Vaccines and Emetine Hydrochloride hypodermically.** - *Lancet.* 1914. June 6. pp. 1605–1606.

This paper concerns itself with a clinical record of two cases of undoubted sprue in females (one in a Mahommedan); in both the symptoms had persisted for several years before they came under observation. The improvement on hypodermic injection of emetine in half-grain doses, increased subsequently to one grain on alternate days, was marked; the stools became less frequent and of a better consistency and colour. Cultures made from the mouth lesions gave a pure growth of streptococci, which were injected as a vaccine in doses of from 50 to 100 millions once a week. The mouth and bowel symptoms rapidly improved. Both patients are said to have been free from symptoms for as much as two months and to have regained some of their lost weight, though this does not appear from the text to have been actually recorded. The author does not look upon emetine in any way as specific in sprue, but is inclined to attribute to it some undefined virtue. The success attending the use of the streptococcal vaccines, he considers, opens up the interesting and suggestive question as to the rôle played by this organism in the disease, at least in some cases.

[The virtue claimed for emetine in sprue is opposed to the experience of the reviewer. Little can be said in support of the streptococcal origin of the disease. The *Streptococcus salivarius*, as is well known, is present in almost every saliva and, according to the reviewer's work, is also present in all buccal ulcerations whether

associated with sprue or not. The absolute impossibility of avoiding extraneous organisms in such a septic cavity as the mouth renders the recognition of the organism involved an especially difficult one.]

P. H. B.

SCHMITTER (Ferdinand). **Sprue treated by Emetin Hydrochlorid.**—*Jl. Amer. Med. Assoc.* 1915. Jan. 2. Vol. 64. No. 1. p. 53.

The author reports a case of sprue in which a remarkable improvement took place after the administration of emetine hydrochloride when all other treatments had been tried in vain; this improvement the author is anxious to ascribe to the drug. His experience of the case confirms what he had previously noted and reported (this *Bulletin*, Vol. 4, p. 12) in six other cases. In the present case the patient, a man of 40 years of age, gained 71 pounds in weight and completely reacquired the sexual powers which he had previously lost.

P. H. B.

CASTELLANI (Aldo). **Notes on the Hyphomycetes found in Sprue; with Remarks on the Classification of Fungi of the Genus "Monilia Gmelin 1791."**—*Jl. Trop. Med. & Hyg.* 1914. Oct. 15. Vol 17. No. 20. pp. 305–310. With 6 figs.

This is practically the same paper as the one reviewed in this *Bulletin*, Vol. 4, p. 533; in effect it creates a number of new species of yeasts belonging to the genus *Monilia*, of which *M. albicans*, the thrush fungus, is the best known example. It is obvious that the preparation of this paper has entailed a great deal of labour, while it is difficult to understand its ultimate object in view of the extreme variability and pleomorphism which these yeasts exhibit, seen in the fact that authors as yet do not appear to be generally agreed upon the typical cultural reactions, or even the method of reproduction, of the type of the genus, *Monilia albicans*. Anyone who has worked out the sugar reactions of different bacilli realizes how variable in minor details they are liable to be. Much more is this the case when one is dealing with a group possessing such marked fermentative powers as the yeasts; it therefore would appear to be rather premature to create and name as new species strains or varieties of these yeasts on such slender characteristics as the formation of a slight amount, or of a very slight amount of gas from a solution of a certain sugar, more especially when the exact strength of the solution, composition of the medium, the temperature, and the period over which the incubation is performed are not specifically stated, for it is well known that the sugar reactions differ slightly from day to day; nor is one informed of any standard whereby "a slight amount of gas" may be distinguished from "a very slight amount," or even a "slight decolorization" of peptonized milk from a "very slight decolorization" of the same medium. It is difficult to comprehend the aim and object of this laborious investigation, in which the author concludes by stating that "in practically every case of sprue it is possible to put

in evidence fungi microscopically or culturally" when in a joint paper with Dr. G. C. Low (1913) (see this *Bulletin*, Vol. 1, p. 725) he stated that yeasts play but a subsidiary part in the etiology of sprue.

On the basis of classification adopted by Dr. Castellani it would be possible to write a volume on the varieties of *Bacillus coli* (as differentiated by sugar reactions) and other organisms found in the normal human intestine, and in describing a species—*Monilia faecalis*—isolated from a sputum "collected from a dirty receptacle," Dr. Castellani exhibits a curious disregard for the niceties of bacteriological technique. The multiplication of species of yeasts on what appear to be such inadequate grounds only tends to obscure what is already a sufficiently difficult subject.

P. H. B.

RELAPSING FEVER.

BISSET (E.). **Relapsing Fever in the Meerut Division.** *Proc. Third All-India Sanitary Conference held at Lucknow, Jan. 19-27, 1914. Vol. 4. Papers.* Suppl. to *Indian Jl. Med. Research.* pp. 114–119.

The author has investigated the part taken by lice in the spread of relapsing fever in the Meerut Division. Of 663 lice, caught on patients suffering from the disease, and carefully dissected and examined, 26·3 per cent. were found to contain spirochaetes. Of 100 lice caught in uninfected villages, none showed the presence of any of these parasites. The spirochaetes were found only in the stomach and coelomic fluid. The salivary glands, ovaries, testicles, Malpighian tubules, and eggs before and after being laid, were all examined with negative results. On three occasions spirochaetes were found in the faeces from an infected louse. The author dissected batches of lice which had been removed from patients and kept without food for periods varying from one to six days, and found that the percentage of those containing spirochaetes was always much about the same, though rarely those that had been starved 5 to 6 days showed spirochaetes in enormous numbers or in tangled masses. Lice collected from convalescents of 10 and 14 days were never infected, whilst some collected six days after the infection still contained spirochaetes.

Various attempts were made to convey the disease to animals. Highly infected lice were fed daily on the shaved abdomen of a monkey; the droppings of 20 to 25 infected lice were mixed with saline and well rubbed into the excoriated abdomen of a second monkey; the coelomic fluid of infected lice was mixed with saline solution and inoculated four times at intervals of a week into a young rat; the coelomic fluid of infected lice was inoculated three times into a chicken at intervals of one week. In every case negative results were obtained.

Finally the author adds some notes on the epidemiology of the disease. With regard to seasonal prevalence the infection was widely spread in the cold weather of 1911–12; it commenced to die down in April and no village was freshly infected after March. In December the disease again appeared in epidemic form and the earliest authentic cases occurred in the latter half of September. It is evident, therefore, that the disease is especially prevalent during the cold season.

All castes may suffer but the vast majority of cases occur among the low and dirty classes. The disease is confined to families, or occupants of the same courtyard, and one can always trace the source of infection in any village. In every locality where cases occurred lice were found in abundance, and there is no other biting insect sufficiently common to account for the great prevalence of the disease.

The author states that the mortality among men is apparently higher than among women. The actual mortality varies considerably, for in one village there were 13 cases with five deaths, whilst in another there were 22 cases without a single death. The great majority of the deaths are caused by exhaustion, especially due to the fact that it is a common belief that a case of fever must be starved.

As a preventive measure it is obvious that there must be a crusade against lice and these insects may easily be killed by exposing any infected clothing to the sun for a few hours.

Finally there is no doubt that the mortality can be very much reduced, if the people can be persuaded to feed their sick, but after the crisis, when the patient often becomes ravenously hungry, it is important that suitable food should be given, or a fatal attack of diarrhoea or dysentery is very liable to ensue.

E. Hindle.

VASSAL (J. J.). **Une Epidémie de Fièvre Récurrente au Tonkin.**—*Far East. Assoc. Trop. Med. C. R. Trois Congrès Biennal, Saigon* (1913). 1914. pp. 296–308.

In 1912 the author observed an epidemic of relapsing fever in the Tonkin province of Kien-An. During this epidemic in 15 villages there were 703 cases of which 339 were fatal, giving a mortality of 48 per cent.

The epidemiology of the disease confirms the view that transmission is effected by means of body-lice, for it is prevalent during the cold season from January or February until June, months during which lice are especially abundant and when the natives herd together, thus offering ideal conditions for the passage of these parasites from one person to another.

The typho-bilious form of the disease was common and in general the main symptoms noted during the epidemic differed in many points from the classic descriptions. Complications were not uncommon and included modifications of the blood (such as anaemia), acute mania, noma, abortion, etc. Relapsing fever in Tonkin has been mistaken for malaria, cholera, plague, typhoid, etc., and is often very difficult to diagnose clinically. The aid of the microscope is indispensable and as the spirochaetes stain very easily they can be detected without much difficulty. Subcutaneous injections of atoxyl were employed in the treatment of 157 cases, and favourably influenced the course of the disease. In 195 cases salvarsan was administered intravenously. The average dose employed was 0·1 gm. for children and 0·25 gm. for adults. In all cases wonderful results were obtained, for after a violent reaction the fever disappeared and the patient recovered. Occasionally relapses occurred but spirochaetes could never be detected in the blood.

Salvarsan sterilizes the carriers of infection and therefore is of great utility in preventing the spread of epidemics. In Tonkin relapsing fever seems to be spreading and therefore it is very important that the disease should be carefully watched and all cases at once sterilized by the use of this medicament.

E. H.

SOMALILAND. **Report [on Outbreak of Relapsing Fever among Camel Constabulary]** by DRAKE-BROCKMAN (R.E.), Medical Officer in Charge of Troops.—Received in Colonial Office 4th February 1915.

In three letters the author adds further notes on relapsing fever in Somaliland [see this *Bulletin*, Vol. 3, p. 4]. The disease seems to have recently extended its range in this region for, with the exception of the coast town of Bulhar, where an epidemic broke out a few years ago, the fever was not known to exist in British Somaliland.

On the return of a company of the Camel Constabulary from Hargeisa to Galoleh a large percentage of the men reported sick and no less than 13 per cent. suffered from relapsing fever at the same time. Although the mortality is slight the patients are often one or two months on the sick list, and therefore its incapacitating power is very considerable. It is uncertain whether the disease has spread from Bulhar to Hargeisa or vice versa, but in the latter case it must have come across Africa. The author records the presence of the transmitting host *Ornithodorus savignyi* at Burao, Ber, and Ged Aboukr on the Arori Plain, in addition to Hargeisa and Bulhar. Up to the present no cases of relapsing fever have been observed in Burao, the military headquarters, but as the tick is known to exist there, special precautions are advisable to prevent the infection being introduced. *Ornithodorus savignyi* is invariably found in dirty and unsanitary surroundings where men and animals congregate, such as in the soil about camping grounds of long standing, under shady trees, and around wells where animals are watered. They bite both men and animals but are not known to convey any parasite harmful to the latter. There is great danger of the ticks being spread by animals after having been watered, for the author on one occasion observed several ticks on the legs of his pony and they were obviously biting him as the animal kept on stamping his feet.

In addition the author records the presence of malignant tertian malaria at Burao. The disease was introduced by members of the Camel Constabulary, after they had visited the Tug Wagali on the borders of British and Abyssinian Somaliland. The disease has not spread owing to the absence of mosquitoes.

E. H.

DUMOLARD (Léon), AUBRY (Georges) & TORRE (Mme). **Les Troubles Psychiques du Typhus Récurrent. (Note Préliminaire.)** *-Rec. Méd. d'Alger.* 1914. May. Vol. 2. pp. 257–259.

The authors have observed various cases of relapsing fever in the hospital at Mustapha, Algeria, and note the frequency of psychic symptoms. Thus out of 17 patients, 14 were affected in this manner. Eleven times there was mental confusion with delirium, and three times simple mental confusion.

These psychic troubles are generally only transient, occurring at the crisis of the first attack; they are rarely present in the relapses. Meningeal symptoms were sometimes observed, but were much less common than psychic troubles.

E. H.

KASSIMATIS (K.). ΚΑΣΣΙΜΑΤΗ (Κ.). *Περὶ τῆς ἐπιδημίας τοῦ ὑποστροφου πυρετοῦ ἐν τῷ Ἑλληνικῷ στρατῷ κατὰ τὴν Ἠπειρωτικὴν ἐκστρατείαν.* [On an Epidemic of Relapsing Fever in the Greek Army during the Campaign in Epirus].—„Ιατρικη Προόδος." 1914. Nov. 1 & 15. Vol. 19. Nos. 21 & 22. pp. 396–401.

In a paper read before a congress of Greek practitioners at Alexandria, the author gives an account of an epidemic of relapsing fever which broke out in the Greek army during the recent military operations.

The disease was first observed in troops returning from Macedonia in the month of December, 1912, and was undoubtedly contracted from the Turks, relapsing fever being known to be endemic in the Turkish territories bordering upon the Black Sea. As many as 700 cases were observed in one division of 10,000 men. Intravenous injection of neo-salvarsan, in doses of 0·6 gm., was the only treatment which gave a satisfactory result.

J. B. Nias.

PRINKOS (N. B.). ΠΡΙΓΚΟΥ (N. B.). *Περὶ τῆς κατὰ τὴν ἐκστρατείαν Ἠπείρου καὶ Μακεδονίας ἐπιδημίας τοῦ ὑποστρόφου πυρετοῦ καὶ τῆς θεραπείας αὐτοῦ.* [On the Epidemic of Relapsing Fever in the Campaign of Epirus and Macedonia and its Treatment.]—„Ἀρχεῖα Ἰατρικῆς." 1914. Sept. 1–20. Ser. 3. Vol. 9. Nos. 25–27. pp. 246–250. With 3 charts.

The author had the opportunity of studying 250 cases of relapsing fever in one of the Greek military hospitals in the month of January, 1913. Of this number 107 were treated with doses of neosalvarsan, in doses ranging from 0·3 to 0·6 gm., with very satisfactory results. A single dose of 0·6 gm., injected hypodermically in the middle of an access of fever, sufficed in every case to bring down the temperature to normal within 24 hours, and prevented, as far as could be ascertained, all further relapses. Two temperature charts are given, showing complete apyrexia for periods of 21 days after the administration of a single injection.

[J. B. N.

NICOLLE (C.) & BLANC (G.). **Les Spirilles de la Fièvre Récurrente sont-ils Virulents aux Phases Successives de leur Évolution chez le Pou? Demonstration de leur Virulence à un Stade Invisible.** — *C. R. Acad. Sci.* 1914. June 15. Vol. 158 No. 24. pp. 1815–1817.

When the North African relapsing fever spirochaetes are ingested by a louse, they rapidly disappear from the body of the insect. About eight days later they reappear in the form of very thin active individuals which soon attain the dimensions of the blood forms. Some days later they again disappear, this time finally.

The authors have injected monkeys with lice taken at varying intervals after an infected meal in order to see whether the spirochaetes were virulent even though their presence could not be detected microscopically. The results were as follows :—

From the 1st to the 4th day no spirochaetes were visible in the lice and the louse contents were not virulent ; on the 5th and 6th days the spirochaetes were still invisible but virulent ; from the 7th to the 9th days slender spirochaetes appeared which were virulent ; on the 10th and following days adult spirochaetes appeared which were non-virulent ; after the 19th day spirochaetes disappeared.

The spirochaetes, therefore, are more especially virulent during the phase immediately preceding, and the first stages after, their re appearance.

The lice used in these experiments were fed twice daily on a human subject who was bitten 9,000 times by infected lice in 1913, and 6,500 times in 1912. In all, this man was bitten 15,500 times by infected lice without any effect and yet when one of these lice was crushed and its contents placed on his conjunctiva the man developed a typical attack of relapsing fever. This experiment is a further proof of the usual method of infection in this disease.

E. H.

NICOLLE (Charles) & BLANC (Georges). **Etudes sur la Fièvre Récurrente poursuivies à l'Institut Pasteur de Tunis. Deuxième Mémoire (1914).**—*Arch. Inst. Pasteur Tunis.* 1914. Dec. 1. Vol. 9. No. 2. pp. 69–83.

The present article is merely a more detailed account of the results published in the preceding paper, together with a summary of Ed. SERGENT and FOLEY'S article on the same subject.

The authors' conclusions, drawn from both series of experiments, are as follows :—

1. In lice fed on infected blood the spirochaetes disappear during the first few hours following a meal, but reappear after an interval of at least six days ; their presence has been noted up to the 25th day.

The results of inoculating ground up lice into monkeys show that from the sixth to the fifteenth day the spirochaetes are always virulent. Before this period the lice are rarely infective, and after infection only very exceptionally.

There is no parallel therefore between the presence of visible spirochaetes in the louse and the infectivity of this insect. On the other hand, the moment which precedes the reappearance of spirochaetes is the time when the lice are most infective, whilst the minimum of virulence is after the adult stage of the spirochaetes has been reached.

2. In monkeys the duration of the immunity following a first attack of relapsing fever is very variable. In the author's experience it has varied from rather less than two and a half months up to more than two years.

3. There is no longer the slightest doubt that for man the bites of lice infected with blood containing spirochaetes are quite innocuous. It is by crushing the lice and scratching and excoriation of the skin, or contamination of the conjunctiva by dirty fingers, that transmission is effected.

4. Both in the louse and in the blood of man, the spirochaete of relapsing fever evolves from an invisible virulent form into an adult visible stage which ceases to be virulent.

Virulence and the power of multiplication seem to be almost exclusively the property of the invisible form ; arrived at the adult state the spirochaete tends to lose both these properties. This theory would explain why the question of the method of reproduction in spirochaetes has not yet been elucidated.

E. H.

FANTHAM (H. B.). **The Granule Phase of Spirochaetes.**—*Ann. Trop. Med. & Parasit.* 1914. Dec. Vol. 8. No. 3. pp. 471–484.

In this interesting article the author reviews recent work on the morphology of spirochaetes with special reference to the nature of the granules that are often formed by these parasites. The author's conclusions, supported by his own work in addition to that of others, are as follows :—

" 1. It is generally accepted, at any rate by those who have worked on the organisms, that spirochaetes form granules by multiple fission. The formation of such granules, variously known as Leishman granules, coccoid bodies or spores, has been observed by various workers in molluscan spirochaetes, in blood spirochaetes, and in *Treponema pallidum*, among others. The significance of the granules, whether cyclical or degenerative, only is in dispute.

" 2. There is danger of generalisation on incomplete evidence in the case of spirochaetal granules. It has never been asserted by any of the investigators who have continued and confirmed LEISHMAN'S work that *all* granules seen in the various tissues of infected ticks (*Ornithodorus moubata* and *Argas persicus*), especially those of the gonads and Malpighian tubules, were of spirochaetal origin. Nor was it ever asserted by LEISHMAN and his supporters that other granules, for example, of a possible mitochondrial or secretory nature, could not occur in tick cells.

" 3. The present writer in his experiments examined control ticks as far as possible, as well as other ticks, such as *Ornithodorus savignyi* and *Ixodes ricinus*, which were not infected with spirochaetes. The granular structures figured by MARCHOUX and COUVY (1913) [see this *Bulletin*, Vol. 2, p. 365] were sometimes seen in the various tissues of the ticks, but often they were not so marked as represented in the figures of those authors.

" 4. The necessity for detailing the climatic conditions, especially of temperature and humidity, under which experimental ticks whether infective or non-infective were kept, cannot be too strongly urged.

" 5. Morphological variation in spirochaetes, due to nutrition affecting growth and division, is well known, and was discussed by the present writer in 1909. The value of gentian violet as a stain in the investigation of spirochaetes was recorded by the writer in 1907 and 1908. These two points, on which MARCHOUX and COUVY lay stress, are not new.

" 6. MARCHOUX and COUVY'S postulate of " invisibly " thin or ultramicroscopic spirochaetes is distinctly weak, and seriously vitiates their contention that spirochaetes remain as such throughout their existence in the tick, and that they must occur as spirochaetes in inoculation material.

" 7. Small spirochaetes have been seen to form and emerge from clusters of refractile spirochaetal granules in fresh infected tick material when examined under dark-ground illumination. Such spirochaetes may invade any organ of the tick and remain therein for long periods.

" 8. There is evidence to show that spirochaetal granules obtained from the organs of infected ticks grow *in vitro* into spirochaetes.

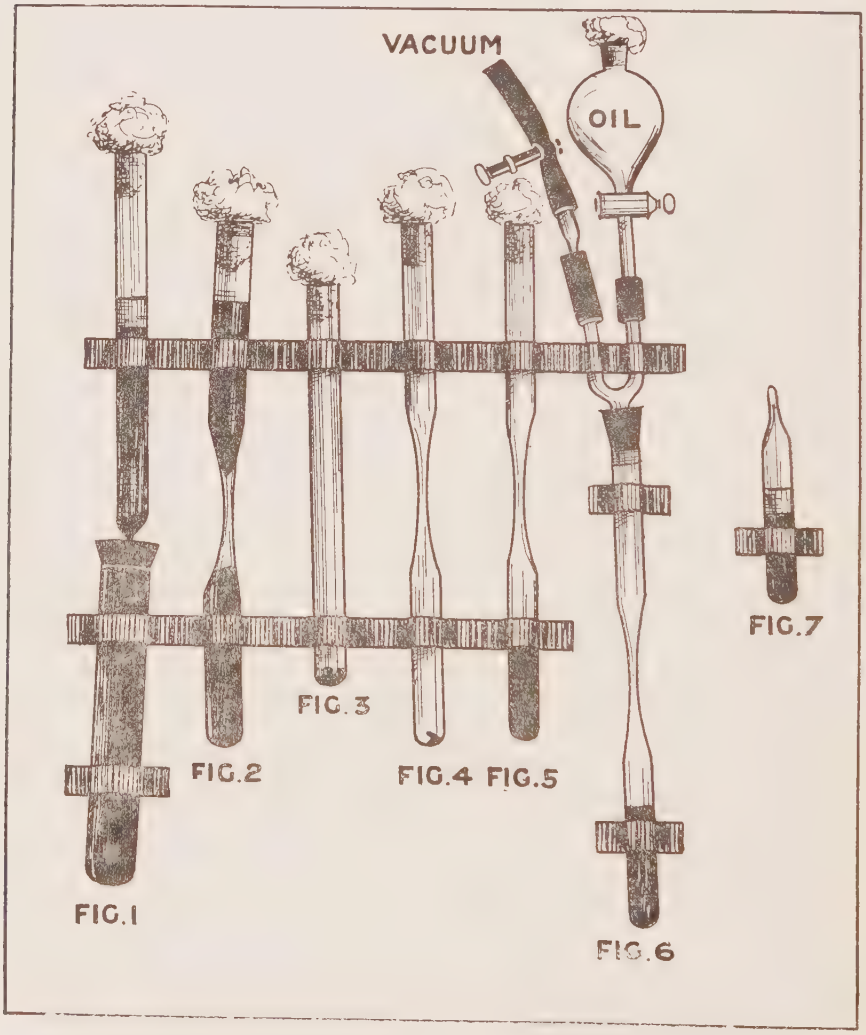
" 9. Detailed and prolonged studies of *Spirochaeta bronchialis* have been made in Khartoum by the writer. It was found that the spirochaete formed granules (coccoid bodies or spores) and that these were the cross-infective stages of the organism. The spirochaetiform phase of *S. bronchialis* dies rapidly outside the human host.

" 10. Recent important researches by SERGENT and FOLEY (1914) have shown that the causal agent of North African relapsing fever, besides its spirochaetiform stage, possesses a very small and equally virulent form which it assumes during apyrexial periods in man, and during a period following an infecting meal in the louse. Very probably such a minute form is of a granular or coccoid nature. NICOLLE and BLANC (1914) conclude that the organisms are infective in the louse just before they reappear as spirochaetes."

E. H.

BRONFENBRENNER (J.). **A Simplified Method for Cultivating Spirochaetes on Liquid Media.**—*Proc. Soc. Experim. Biol. & Med.* 1914. June 6. Vol. 11. No. 6. pp. 185–187. With 1 fig.

The author describes a modification of NOGUCHI's original method of cultivating spirochaetes (see this *Bulletin*, Vol. 1, p. 141), which has the advantage of doing away with the rubber stopper connection between the upper and lower parts of the apparatus, often a source of contamination.



"This new method can be used in two different ways. Firstly, one can use the tube as shown on Fig. 2 which instead of having the rubber connection of Noguchi joining its two parts as shown in Fig. 1, is made entirely out of one glass tube; but otherwise can be used exactly as Noguchi's apparatus, namely the lower part in which the piece of rabbit kidney is put before the tube is drawn out, is filled with the ascitic broth or sheep serum water up to the point where the tube broadens out again; another

piece of tissue is placed in the upper portion of the tube and this tube is filled with the ascitic agar into which the spirochaete culture is placed.* Sterile paraffin oil in a thin layer is placed above the agar and the tube is incubated. Spirochaetes during their growth filter through into the lower portion of the tube exactly as in Noguchi's method. This method is especially convenient when one intends to open the tube many times to examine its contents. The other and better way however of cultivating spirochaetes which does away entirely with the upper part of the tube,† is the following :—I put a piece of tissue at the bottom of the tube ; draw it out as before ; introduce by means of a capillary pipette the spirochaete culture and ascitic broth in the lower tube ; connect the tube with the vacuum pump, as shown in Fig. 6, warming the lower part of the tube in a water bath at 37° to facilitate the exhaustion of the air ; cover the ascitic broth, after exhaustion, with sterile paraffin oil by means of a special arrangement taking advantage of the negative pressure in the tube, and finally seal the lower part of the tube at the point of strangulation as shown in Fig. 7. The paraffin oil in this tube makes it possible to preserve spirochaetes alive even after the tube is once opened. By this simple method I have been carrying successfully my subcultures of spirochaetes for the last three months."

M'Leod (J. W.) & Soga (A. R. B.). **A Simplified Method for the Cultivation, in Fluid Media containing Coagulable Albumin, of Bacteria requiring Anaerobic Conditions, notably the Pathogenic Spirochaetes.**—*Jl. of Path. & Bact.* 1914. Oct. Vol. 19. No. 2. pp. 210–213. With 1 fig.

The author describes a simple modification of Noguchi's method of cultivating spirochaetes, which is capable of general application to the cultivation of anaerobic bacteria in fluid media, with the exception of such bacteria as cause active gas formation.

An ordinary tube is fitted with a perforated rubber bung. A piece of glass tubing is introduced to within a short distance of the lower end of the bung, and the free part of the tubing is drawn out into a capillary tube and bent over at an acute angle. The tube is then filled to half or two-thirds of its depth with peptone bouillon. The bouillon is then boiled and when it has cooled a portion of sterile rabbit's kidney is introduced. Then a piece of cotton wool, which has been threaded through a glass bead, is soaked with the material it is desired to inoculate, and this also dropped in the tube. This method ensures that the organisms which are to be cultivated shall, from the outset, be in that area of the tube where cultural conditions are likely to be most favourable, *i.e.*, in the neighbourhood of the kidney. Finally, ascitic fluid is run in with a pipette till the level of the liquid within the tube is within a distance of its mouth which corresponds to half the depth of the bung. The bung is now introduced and, as it is pushed well down in the tube, the fluid gradually rises into the glass tubing, and when it reaches the bend of the capillary tube the open end of the latter is sealed in the flame.

Fluid can easily be withdrawn at any stage of the culture by merely sterilizing the capillary tube, then breaking off the tip and introducing a very fine capillary tube.

*It was found that spirochaetes penetrate into the lower tube more readily if 1 per cent. agar is used for the ascitic-agar mixture instead of 2 per cent., as recommended by Noguchi.

†A Florence flask with a long neck can be used in place of the tube if a larger quantity of culture is wanted.

Employing strains of *Treponema pallidum*, *T. microdentium* and *Spirochaeta refringens*, respectively, the author obtained successful cultures in 50 to 60 per cent. of the cases. More rapid and copious growth was obtained by using ascitic fluid that had been exhausted previously by means of a vacuum pump than in a parallel culture put up with another portion of the same ascitic fluid which had not been exhausted.

E. H.

SAPHIER (Johann). **Ueber die Herstellung der haltbaren Kollargolpräparate von Spirochäten und Hyphomyzeten.** [The Production of Permanent Collargol Preparations of Spirochaetes and Hyphomycetes.]—*Wien. Klin. Woch.* 1914. Aug. 13. Vol. 27. No. 33. pp. 1214–1215.

In the *Centralblatt für Bakteriologie*, Vol. 63, p. 7, NITSCHE described a modification of BURRI's method of demonstrating spirochaetes. The method consisted in treating the smears with colloidal metals and such preparations show the parasites very clearly, but have the disadvantage that they fade in a few weeks. The author describes a modification of the method by means of which permanent preparations may be obtained.

Ordinary dry smears are treated with 1 to 2 per cent. collargol solution and after two or three minutes the slides are placed vertically and dried in the air. The preparations are then put aside for one to three days after which they are fixed by a short immersion in 2 per cent. sodium hyposulphite, then washed in running water and dried.

Such preparations are said to be permanent and to give very sharp clear outlines of the parasites.

E. H.

MALARIA.

HODGSON (E. C.). **Malaria in the New Province of Delhi.**—*Indian Jl. Med. Research.* 1914. Oct. Vol. 2. No. 2. pp. 405–455. With 5 charts. 5 plates and 7 maps.

This elaborate report, copiously furnished with maps, charts, illustrations and tables, though it is certain to prove of the greatest service locally, scarcely requires a lengthy summary here. It is concerned with the following subjects :—

1. The geography, physical features, climate and population of the Province.
2. The anopheline mosquitoes found therein.
3. The relation of these mosquitoes to the spleen and parasite rate.
4. The larvivorous fish of the Province.
5. The amount of malaria present, as illustrated by maps and charts.
6. The conditions generally as regards malaria throughout the Province, including Delhi city.

The author's conclusions and recommendations complete the paper.

It may be noted that the new province is merely a strip of territory about 25 miles long by 17 wide, that it contains one large city, namely Delhi, and numerous small villages.

Malaria chiefly occurs about the commencement of the cold weather, when the pools left by the monsoon,which have been the breeding places of countless anophelines, are beginning to dry up. Only four species of these can be considered as important factors in the spread of malaria. These are :—*A. culicifacies*, *A. stephensi*, *A. rossii*, and *A. fuliginosus*. In the first two only did dissection reveal the presence of malarial parasites. It is doubtful if the other two are operative to any extent.

The four larvivorous fish found to be of value are *Trichogaster fasciatus*, *Barbus phutanio*, *Nuria danrica* and *Ophiocephalus punctatus*. [See this *Bulletin*, Vol. 2, pp. 652 and 653.] The first mentioned seems the hardiest and most effective, a good example, accustomed to captivity, devouring fully 200 anopheline larvae in a day.

The same useful, graphic method for making maps is employed as that mentioned and illustrated in the review of the author's paper on Madras [see this *Bulletin*, Vol. 5, p. 42], and in certain cases a new scheme of colour conventions for the circle sectors has been added, so that the proportion of births to deaths, the percentage of enlarged spleen in children and the relative prevalence of each variety of mosquito during the fever season can be seen at a glance in the case of each district or area.

It is shown that the country to the south of Delhi city is far healthier than that to the north, and that the city itself holds an intermediate position. Further, it was found that the relative frequency of occurrence of carrier mosquitoes corresponded remarkably closely with the amount of malaria judged by other methods.

The rest of the report is chiefly of local interest, but it is gratifying to note that the proposed cantonment site is the area which suffers

least of all from malaria. The recommendations vary greatly in their nature. Many, especially those for the Bela, an old river-bed and now a marshy strip, indicate the necessity for engineering operations. The author discusses various proposals and indicates useful temporary measures.

[It is clear from this and other reports that the old haphazard days are over, and that a new spirit is abroad in India, where the sanitary motto would now, most fortunately, appear to be "Look before you leap."]

A. Balfour.

GILL (C. A.). **Report on Malaria in the Punjab during the year 1913, together with an Account of the Work of the Punjab Malaria Bureau.** Lahore. 1914. 8pp. F'cap. With Appendix, 3 charts and 1 map. Printed by the Supt. Govt. Printing, Punjab.

Papers dealing with various aspects of the above subject have so frequently been summarised in this *Bulletin* that it is unnecessary to discuss Captain Gill's latest contribution at any length. Suffice it to say that he considers both the endemic malaria of the Punjab and the epidemic malaria present in 1913. A brief report of the work done by the Punjab Malaria Bureau is given and a general note on anti-malaria measures, in the course of which the author expresses the opinion that "practical results of considerable magnitude may be attained within a comparatively short time." "Mortality" and "Fever" charts for the Punjab from 1867 to 1913, and a chart showing the rainfall and the monthly fever mortality in the Punjab during 1913 are features of this communication.

A. B.

PERRY (E. L.). **Endemic Malaria of the Jeypore Hill Tracts of the Madras Presidency.**—*Indian Jl. Med. Research.* 1914. Oct. Vol. 2. No. 2. pp. 456–491. With 5 plates, 1 chart and a map.

This is a lengthy and very thorough report which considers every aspect of the problem of endemic malaria in the Jeypore Hill tracts, a region midway between Calcutta and Madras. Though full of local interest, it cannot be said to present anything either new or of special value for the general reader. Hence it is unnecessary to do more than record the fact that in this district malaria is severe and blackwater fever of frequent occurrence. Anophelines, however, are comparatively scarce. As the author says, "Serving in the Jeypore country is like serving in a hostile country where the enemy have untold reserves of ammunition, but a limited number of rifles. In the Jeypore country the supply of ammunition in the shape of parasites of a deadly type in the blood of the aborigines is practically unlimited, but *the supply of rifles in the guise of anophelines is distinctly limited.*"

Hence this is a place where the value of personal prophylaxis is very clearly in evidence.

A. B.

MUSGRAVE (W. E.), WALKER (E. L.), JACKSON (T. W.), BANKS (C. S.), VAZQUEZ (A.), GUTIERREZ (P.), DALBURG (F. A.), CONCEPCION (I.), COX (S. L.) & GUZMAN (A.). **Sanitary Survey of the San José Estate and Adjacent Properties on Mindoro Island, Philippine Islands, with Special Reference to the Epidemiology of Malaria.**—*Philippine Jl. of Sci.* Sect. B. Trop. Med. 1914. Apr. Vol. 9. No. 2. pp. 137–197. With 1 plate and 2 text figs.

The San José estate lies on the west coast of the island of Mindoro and extends over from 210 to 260 square kilometres. It lies between sea and mountains and presents a problem for the tropical sanitarian. Although its lands are very fertile it has long been known as the "white man's grave," and even the wild native tribes shun the locality. As at the present time, so in the past, malaria would seem to be the chief cause of the high mortality rate amongst the 3,200 people employed on the estate and the remaining 2,300 scattered about the municipality of Pandorocan of which it forms a part. The barrios or villages of this municipality are in a very bad sanitary condition and, according to DALBURG, are the most generally and severely infected in the Philippine Islands.

The sanitary survey was very complete, but it is only necessary to notice certain points in connection with the malaria aspect of the question, and even these are chiefly of local interest.

As regards mosquitoes, *Myzomyia rossii* and *Culex ludlowii* are specially in evidence, though already something has been done in expelling them from certain areas. The former can breed both in fresh and salt water and is the only abundant species in the Philippines which has been proved to be a malaria carrier.

A blood survey of 1,095 persons showed that 34·06 per cent. of the inhabitants harboured malarial parasites, while a spleen survey showed splenomegaly in 26·21 per cent. In one village the spleen index in children was 98 per cent. It appeared that the percentage of total agreement between the spleen rate and the parasite rate was greater in children than in adults. So far as the determination of the incidence of malarial infection at San José went, the parasite rate was found to be the more reliable method because more cases were discovered by its means, and because the results in positive cases are unequivocal. Some 35 per cent. of the total population are infected with malaria, and this infection is kept up by recurrence in old cases, by the immigration of new cases and by fresh infections.

The questions of infant mortality and of tuberculosis are the most important sanitary problems in the Philippines, but that of malaria comes next and is very much to the fore on the west coast of Mindoro. The sanitary problem of the estate as a whole is likened to that which confronted the Americans at Panama and the lengthy list of recommendations which concludes the paper is based upon Canal Zone experience. Special stress is laid on the prevention of malaria from without, and for this purpose the following measures are essential :—

1. There should be arrangements for proper physical examination of all laborers at their points of embarkation and before their services are accepted by the company.

2. Communication with the badly infected barrios adjacent to the property must cease, and in the enforcement of this phase of the question generous Government support will be necessary. As will be indicated in

the final report of the Commission, a number of these barrios should be transferred to more healthful locations, and aggressive and persistent municipal effort should be employed in cleaning up the other infected places.

A. B.

i. CARTER (H. R.). **Impounded Water. Some General Considerations on its Effect on the Prevalence of Malaria.**—*U.S. Public Health Rep.* 1914. Dec. 25. Vol. 29. No. 52. pp. 3458–3468. With 2 figs.

ii. **Impounded Waters. Their Effect on the Prevalence of Malaria—Survey at Blewetts Falls.**—*Ibid.* 1915. Jan. 1. Vol. 30. No. 1. pp. 15–33. With a map.

i. The effect of impounding water for industrial purposes by means of a dam will vary, so far as anopheline breeding places are concerned, with the local conditions, but it will certainly have the effect of changing the location of such breeding places. As the author points out, this would probably be a disadvantage in the malarious regions of the U.S.A. for, in these localities which have long been settled, the site of residences has been determined by the healthiness of the location, the more malarious situations being avoided. The conditions affecting the breeding of mosquitoes in the pond are :—

1. Change of level under normal operation of power plant. Changes of elevation within a shorter time than the cycle of mosquito development should tend to prevent breeding.

2. Winds. The effect of winds is to lessen breeding. It is greater in the case of the pond than in that of the river or stream before impounding. Waves raised by wind are said to drown larvae.

3. Driftwood and "floatage." Large driftwood protects larvae ; small "floatage" saves them from the attacks of fish ; hence both do harm.

4. Bushes growing in the pond. Until they die these are harmful as they prevent the larvae-protecting drift from reaching the bank, and also guard the shore from wave action which is detrimental to mosquito life.

5. Grass and weeds. Grass growing in shallow water should protect larvae from fish.

6. Algae. Their presence should influence the breeding of mosquitoes—in what manner is not stated [probably favourably], but anophelines are rarely, if ever, found along with dead and decomposing algae.

7. Fish and other aquatic enemies. Their influence will depend on local conditions. In one instance large numbers of a "water flea," or "water boatman" of the genus *Corisa*, which are said to feed on mosquito larvae, were found in water where the latter were not present although one would have expected to find them.

The author gives instructions as to how a pond survey would be made, and points out that a pond undergoes much change within the first few years of its existence. As it gets older it should become less suitable for mosquito breeding, save as regards the growth of aquatic grasses and algae.

ii. This paper is really a continuation of the theoretical one just summarised, and gives an account of the conditions found in the case of the pond of the power plant at Blewetts Falls, North Carolina. Most of the author's views, as above expressed, received confirmation. It may be noted that large driftwood formed a very poor protection for larvae, and that the fall in level of the pond acted as an efficient deterrent to mosquito production because much "floatage" (small drift) was stranded, and so the larvae were rendered more accessible to the attacks of fish.

[These are interesting papers and deal with a question which has not received much attention in the past. As tropical countries develop such problems will probably present themselves more frequently, and reference to this work is likely to be useful. For example, large schemes for impounding the water of the Blue Nile and the White Nile have been mooted, and the effect of such measures on mosquito life and prevalence will have to be carefully considered, especially in the former case. They are likely to be wholly beneficial.]

A. B.

MACFIE (J. W. Scott). **Note on Fatal and exceptionally Intense Infection with Malaria** (*P. falciparum*).—*Lancet.* 1914. Dec. 12. pp. 1354–1356.

An account of a case occurring at Sekondi in the Gold Coast Colony, West Africa, a place where mosquitoes are rife. The patient was an engine-driver, thirty-eight years of age, who lived a trying life, had bad quarters, was exposed to mosquito bites, suffered frequently from malaria and was careless in his quinine prophylaxis.

He had been five years in India before coming to West Africa, and at the time of his fatal illness was in the fourth month of his first tour of African service.

He was taken ill on August 30th and died comatose on September 1st, his temperature reaching its highest point, i.e. 104° F. shortly before his death. An examination of blood films taken on August 30th revealed a few segmenting quartan parasites and a very heavy infection with the young ring form of *P. falciparum*.

A table shows the distribution of 2,000 red corpuscles according to the number of parasites invading them. Multiple infection was common, 271 cells, or 29·7 per cent. showing two parasites, 70 or 3·5 per cent. harbouring three parasites, and as many as 14, or 0·7 per cent. with four parasites apiece. The total percentage of cells infected was 47·65, and there were 1,423 parasites altogether in the 2,000 haemocytes counted.

Comparing this number with others reported by ROSS, ROGERS, DEEKS and JAMES, the author concludes that the case was one of exceptional severity. A considerable number of extra-cellular parasites was found, a condition which is undoubtedly rare. Macfie discusses their significance. Many appeared to be merozoites which had not succeeded in penetrating the corpuscles.

A differential leucocyte count was made, 1,000 cells being counted. There was a great increase of large mononuclears and transitionals (31·5 per cent.) and a diminution (10·1 per cent.) in the number of the

lymphocytes. [Presumably under this term the author includes both large and small varieties.] The polymorphs, on the other hand, were more numerous (58 per cent.) than one would have expected.

Phagocytosis of the malaria parasites was a noteworthy feature of the films, and a table showing the percentage of leucocytes of the polymorph and large mononuclear types containing ingested parasites and pigment is given.

So far as the engulfing of parasites was concerned, the polymorphs were the more active cells, but even in the case of pigment the polymorphs were found to play almost as great a part as the large mononuclears, a sufficiently uncommon occurrence.*

A. B.

SEIFERT (M. J.). **Latent Atypical Malaria complicating the Puerperium.** *Jl. Amer. Med. Assoc.* 1914. Dec. 19. Vol. 63. No. 25. pp. 2215–2216.

Seifert discusses the influence of malaria on pregnancy, citing several authors and pointing out the necessity for repeated blood examinations in cases of masked malaria where the symptoms per se are merely confusing, and where the diagnosis rests on microscopic findings and therapeutic tests. [The latter, as pointed out by HENSON should not be relied upon as an aid to diagnosis. See this *Bulletin*, Vol. 3, p. 60.] An account is given of a very difficult case in which eventually a latent atypical malaria was found to be complicating the puerperium in a patient suffering from a long standing chronic nephritis. An acute exacerbation of the nephritis occurred, together with acute mammitis and, to crown all, a late gonorrheal infection. All this formed a very perplexing symptom-complex.

The patient, an American, aged twenty-five, had lived in Illinois all her life. When between fifteen and eighteen she suffered from anaemia complicated at one period by dropsy. She married at the age of twenty and bore a healthy child nearly a year later. On the sixth day after labour she suffered from chills and fever without any local symptom to account for them. Malaria was not then suspected, and under a sympathetic treatment she recovered and continued well until after her second pregnancy at the age of twenty-five. Labour was followed by lacerations, haemorrhages and fainting attacks. There was some rise of pulse and temperature, but both subsided to normal and the condition was looked upon as being dependent on the severity of the labour and the chronic nephritis which was known to exist.

Six days later acute mammitis supervened, together with fever and quickened pulse. These symptoms continued and, in the absence of any other septic complication, were attributed to the breast condition, even after the services of a consultant had been requisitioned. The temperature ran high, ranging from 104° to 105° F., while the pulse rate was 120 to 140. No periodicity was observed.

As the patient was losing ground, the situation was carefully reviewed, and it was found that malaria was the only disease which had

*A paper by J. CROPPER, entitled "Phenomenal Abundance of Parasites in the Peripheral Circulation of a Fatal Case of Pernicious Malaria" (*Transactions of the Society of Tropical Medicine & Hygiene.* 1907–8. Vol. 1, p. 145) is worth consulting in this connection.—[ED.]

not been considered. This led to a blood examination, the discovery of a large tertian infection, specific treatment and rapid recovery. At a later period gonorrheal infection was found to exist.

Points of interest are that the patient had never lived in a strictly malarial locality and never had an attack of malaria until after labour. At no time were the symptoms typical of malaria. The author concludes with a plea for a more thorough investigation of all unusual cases seen in general practice, especially in the direction of laboratory diagnosis.

A. B.

SPAGNOLIO (G.). **Tremore Ritmico del Mascellare Inferiore in Donna affetta da Malaria Estivo-Autunnale.** [Rhythmic Tremor of the lower Jaw in a Woman affected with Aestivo-Autumnal Malaria.] —*Lavori d. Soc. Italiana di Patologia Esotica.* 1914. p. 151.

The patient was a woman, aged 59, who was taken in the month of October, 1913, with a typical attack of aestivo-autumnal fever which lasted more or less in spite of treatment throughout the following winter. In the month of December, there appeared a rhythmical tremor of the lower jaw which persisted even in the intervals between the attacks of fever. The tremor was involuntary and rhythmical, at the rate of 3 to 5 oscillations a second, and continued for a period ranging from a few seconds up to a minute. It increased in severity when any attempt was made to check it voluntarily, with the mouth open, but when the mouth was strongly closed it diminished considerably. The blood of the patient showed crescents.

By the assiduous use of euquinine the malarial infection was considerably reduced in intensity and simultaneously the tremor diminished in amount. The patient ceased attendance before the cure was complete, so that the ultimate result was not ascertainable. The writer thinks that the tremor depended on the malarial infection.

J. B. Nias.

MARGULIS (M. S.). **Zur Frage der pathologisch-anatomischen Veränderungen in Gehirn bei bösartiger Malaria.** [The Pathological Changes in the Brain in Severe Malaria.]—*Neurolog. Centralbl.* 1914. Sept. Vol. 33. No. 16–17. pp. 1019–1024. With 2 text figs.

This is an account of the microscopic changes found in the brain of a man who died from malignant malaria in an hospital in Moscow. The author records the case as he is of opinion that some of the brain lesions were peculiar. In this connection he specially mentions the marked evidence of stasis, the perivascular necrotic areas in the brain substance and their replacement by neuroglia substance round the vessels which are in a state of stasis; also the diffuse neuroglia proliferation in the cortex and sub-cortical white substance, a condition analagous to the sclerosis found in other parenchymatous organs.

The microphotographs, which are not well reproduced, show some of these changes and are supposed to show plasmodia in the brain capillaries.

[The condition seems to resemble what is found in sleeping sickness.]

A. B.

WERNER (H.). **Kombinierte Behandlung von Malaria (Chinin-Salvarsan. Methylblau).** [Combined Treatment of Malaria with Quinine, Salvarsan and Methylene Blue.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. Oct. Vol 18. No. 20. pp. 679–685.

Werner has found that, using salvarsan, he could clear the peripheral blood of malarial parasites in, on an average, seventeen hours whereas, employing quinine, the time was thirty-six hours. In some cases a single intravenous injection of 0·5 grammes of salvarsan has served to bring about what appears to be a permanent cure, i.e., there has been no relapse within two years of the treatment. In other cases, however, a second dose has had to be given and it is in an effort to secure the *Therapia sterilisans magna* of EHRLICH that Werner has been trying the combined therapy of which this paper treats.

An account is given of the results obtained *in vitro* by mixing salvarsan and quinine, salvarsan and methylene blue, quinine and methylene blue, and finally all three drugs together.

Only the mixtures of salvarsan and methylene blue, and quinine and methylene blue yielded clear solutions. In the other cases a cloudiness occurred which was partly or wholly cleared up by the addition of sodium carbonate.

Some animal experiments were conducted and then the combined therapy was tested both on cases of sub-tertian (tropical) malaria and benign tertian malaria. The results are shown in the form of tables and Werner concludes that in both forms of malaria a considerably reduced dose can be relied upon to give satisfactory results when a combination of quinine and neo-salvarsan is employed.

He says that efforts must be directed towards giving the largest possible doses to obtain the *Therapia sterilisans magna*, and thinks that the value of methylene blue in combination with the other drugs should also be tested in the case of man.

A. B.

CONIGLIO (C.). **Prime Esperienze sull' Azione dell' Optochin nella Malaria.** [Preliminary Experiences with Optochin in the Treatment of Malaria.]—*Lavori d. Soc. Italiana di Patologia Esotica.* 1914. pp. 152–153.

The author tried optochin in competition with chlorhydrate of quinine in equal doses on two sets of patients suffering from malaria, there being six patients in each set, four adults and two children. The dose of the remedy amounted to a gramme in the case of the adults, and 0·3 of a gramme in the case of the children. The general result was that the optochin showed itself rather more efficacious than the hydrochlorate of quinine; but the number of cases is obviously too small for a conclusive opinion.

J. B. N.

HATORI (J.). **The Anti-Malarial Campaign in Formosa.**—*Ann. Trop. Med. & Parasit.* 1914. Dec. 15. Vol. 8. No. 3. pp. 537–552. With a map and 3 charts.

In Formosa the measures taken by the Government have been chiefly directed to the treatment of malaria "carriers." The quinine preparations employed are 0·2 gramme muriate of quinine tablets

euquinine powder for children and other suitable cases, and "Esanophele" pills for cases with splenomegaly. Police officials supervise their free distribution.

As a result of this systematic quininisation the parasite and spleen indices have decreased, and the fever-rate and malaria death-rate have been lowered. Tables are given in proof of these statements. The total number of persons treated was 14,454, and the cost worked out at about elevenpence per head. A map of Formosa shows the localities where the measure was put in force, and at the end of the paper the regulations embodied in a malaria ordinance and certain additional rules as regards anti-mosquito work and general hygienic measures are given. A. B.

CRAIG (Charles F.). **The Prophylaxis of Malaria with Special Reference to the Military Service.**—*U.S. Army War Dept., Office of the Surgeon General. Bulletin No. 6.*—1914. Aug. 115 pp. With 3 charts and 1 plate.

A compact, useful and well-illustrated monograph full of information on all points relating to malarial prophylaxis and containing a chapter on the malarial mosquitoes. Here we find a table giving, so far as is known, a list of those anophelines which have been proved to be carriers of the parasites, classed according to their geographical distribution. As the table seems up to date, save perhaps as regards the mosquito nomenclature, it is here reproduced as likely to be useful.

LOCALITY.	SPECIES OF MALARIA MOSQUITOES.
United States	*Cellia albimanus, Cellia argyritarsis, Anopheles maculipennis, Anopheles quadrimaculatus, Anopheles crucians, Anopheles intermedium, Anopheles pseudomaculipes, Anopheles pseudopunctipennis, Anopheles tarsimaculata.*
West Indies	*Cellia albimanus, Cellia argyritarsis.*
Canal Zone, Panama	*Cellia argyritarsis, Cellia albimanus, Anopheles pseudopunctipennis, Anopheles tarsimaculata.*
Philippine Islands	*Myzomyia funesta, Myzorhynchus sinensis, Myzorhynchus barbirostris, Nyssorhynchus fuliginosus, Myzomyia ludlowii ?*
Central and South America	*Anopheles albipes, Pyretophorus lutzii, Cellia argyritarsis, Cellia albimanus, Anopheles pseudomaculipes, Anopheles intermedium, Anopheles cruzii.*
Europe	*Anopheles maculipennis, Anopheles bifurcatus, Anopheles superpictus, Myzomyia hispaniola, Myzorhynchus pseudopictus.*
Asia	*Myzomyia culicifacies, Myzomyia listonii, Myzomyia turkhudi, Myzorhynchus barbirostris, Myzorhynchus sinensis, Nyssorhynchus theobaldi, Nyssorhynchus stephensii, Nyssorhynchus fuliginosus, Nyssorhynchus maculipalpis, Pyretophorus jeyporensis.*
Africa	*Myzomyia funesta, Myzomyia nili, Myzorhynchus barbirostris, Myzorhynchus paludis, Cellia pharoensis, Pyretophorus costalis, Pyretophorus chaudoyei.*

The work is frankly a compilation and, as it contains little that has not appeared before, does not require an extensive summary, but the method followed by the author may be mentioned together with a few points worthy of notice. An introduction gives examples of successful malaria prophylaxis, and is illustrated by a striking chart showing the remarkable decrease in the incidence of the disease in the Panama Canal Zone amongst employees of the Isthmian Canal Commission from 1906 to 1912 inclusive.

Other charts show the results obtained in the American army. A chapter on the malaria plasmodia follows with some useful notes on objects apt to be mistaken for them, and is succeeded by the section devoted to the malaria mosquitoes. It contains much useful information within a small compass.

Anti-mosquito measures are then described, special attention being paid to the question of the abolition of breeding places in or about quarters and barracks. In this connection the can of water often placed under table legs in the Tropics to prevent ants getting at food receives due notice. [It may be pointed out that oiled rags fastened round the table legs serve the purpose equally well.]

A chapter is devoted to the methods in vogue for protecting man from mosquito bites. The question of the size of the mesh in wire netting is important, and Craig, after reviewing the subject, says :—" From these various observations it appears to me that in the military service all screening should contain at least 18 meshes to the linear inch, and I believe that it is a mistake to use wire gauze containing more than this number, both because it is unnecessary so far as practical protection goes and because it reduces by just so much the amount of air admitted to a room or building."

The use of mosquito repellants on the skin cannot be of any great value to men on military service. A mixture of one part of bergamot oil to sixteen parts of kerosene has been used with success by American troops when marching in the Philippines. One part of citronella oil to six parts of liquid vaseline, or a teaspoonful of the oil to two ounces of ordinary vaseline, makes a good application for temporary use.

Chapter 5 is concerned with quinine prophylaxis. For military purposes the author advocates the administration of 6 grains of quinine sulphate to every soldier every day, preferably in an equal morning and evening dose, but failing that in a single evening dose. Smaller doses are useless, being inefficient and possibly also leading to the production of quinine-fast strains of the plasmodia, though Craig says there is no scientific proof that such exist.

There is a good deal about latent infection and gamete carriers and a final chapter devoted to prophylaxis in the field, in semi-permanent camps and in permanent camps. The final paragraph may well be quoted. "In conclusion," says Craig, "it may be stated that the malarial fevers are entirely preventable, and their presence, to any extent, in an army post is a reflection either upon the intelligence of the sanitary officer in control, or upon that of other authorities who, either by indifference to the recommendations of the sanitary officer or unwillingness to supply the necessary funds, have rendered the efforts at prophylaxis futile."

A. B.

ORENSTEIN (A. J.). **Contribution to the Study of the Value of Quininization in the Eradication of Malaria.**—*Jl. Amer. Med. Assoc.* 1914. Nov. 28. Vol. 63. No. 22. pp. 1931–1933.

In the light of what has previously been written on this subject (see this *Bulletin*, Vol. 3, p. 155 and Vol. 4, p. 380), the above paper is specially interesting. It deals with the results obtained by OLLWIG from using KOCH's method in German East Africa, and more especially in Daressalam. It shows that, at any rate until quite recently, the sanitary conditions there were by no means above reproach; it speaks of able and zealous officers being hampered in their anti-mosquito efforts by passive and active resistance, lack of funds and "red tape," and it asserts that the so-called systematic quininisation or treatment of "carriers" has been a failure. From an experiment which the author carried out it would seem that much better results can be obtained by following ROSS's method. The author does not condemn the prophylactic use of quinine. He merely states that the value of systematic quininisation is, in his opinion, very slight "in the case of a permanent community of considerable size in a country where anophelines capable of transmitting malaria abound, and where, in addition, changes of population due to immigration serve to introduce more or less continuous gamete carriers."

[Though some of the facts and figures stated bear out the author's contention, it would be well to accept his conclusions with some reserve, as he does not seem to have gone sufficiently fully into the subject to justify so definite a conclusion. He is probably correct but should furnish further proof.]

A. B.

CRAIG (Charles F.). **New Varieties and Species of Malaria Plasmodia.** —*Jl. of Parasit.* 1914. Dec. Vol. 1. No. 2. pp. 85–94.

Like most other protozoologists, Craig believes in the plurality of species of the malarial parasite. He points out that authorities disagree as to how many species should be recognised, and recalls the fact that in previous communications he asserted that two forms of the parasite of aestivo-autumnal malaria existed, one sporulating in 48 hours and one in 24 hours. For the latter he proposed in 1909 the name of *Plasmodium falciparum quotidianum.*

He now directs attention to the *P. vivax* variety *minuta* recently described by AHMED EMIN [see this *Bulletin*, Vol. 4, p. 88]. In 1900 he published in the Report of the Surgeon-General of the U.S. Army a description of a small plasmodium which he found in the blood of six patients from the Philippines. He quotes this description, with which he finds Emin's account of *minuta* tallies, and he expresses his conviction that the variety is a valid one.

EMIN was doubtful as to whether or not Schüffner's dots occurred in the infected erythrocytes. Craig finds they do, but not so often as in benign tertian infections, while the dots are both smaller and less numerous. He notes that this variety *minuta* is apt to be confounded with the quartan plasmodium and believes that those who have described Schüffner's dots in quartan infections have been in reality dealing with Emin's parasite.

There can be no doubt of the close relationship of the latter to the tertian plasmodium, while it can easily be distinguished from either form of *P. falciparum*. Craig does not think that this parasite is entitled to specific rank and recommends that it be known by the name Emin gave it, i.e., *Plasmodium vivax* variety *minuta*.

He then passes on to a consideration of the so-called *Plasmodium tenue* of STEPHENS, the validity of which has already been called in question by BALFOUR and WENYON [see this *Bulletin*, Vol. 5, p. 53]. Craig is in accord with them and advances very similar arguments to show that STEPHENS' parasite cannot, so far, be regarded as a new species.

Craig has on several occasions encountered forms identical with *P. tenue*, which he is inclined to regard as a rather typical form, not of *P. falciparum* but of *P. vivax*. He advances arguments in favour of this view and also states that "the reasons underlying the production of morphologically atypical generations of malaria plasmodia are obscure, but I am convinced that insufficient dosage with quinine, and perhaps with other drugs, often leads to the production of such plasmodia and that these plasmodia may retain for several generations morphological abnormalities produced by adverse agencies, either physical or chemical."

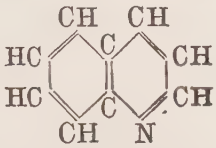
He has seen plasmodia which had been modified morphologically by quinine return to normal morphology when the drug was discontinued, and he regards a stimulation in the amoeboid activity of plasmodia as one of the most common effects of quinine. He does not, however, argue that quinine was the cause of the peculiar shapes shown by STEPHENS' parasite, but he does think that the latter "cannot be accepted as a new species until the morphology of the parasites during the entire human life cycle at least is studied, for the only claim it now has to specific rank is the presence of slight differences in morphology during a very limited portion of the human life cycle, that is, the early unpigmented stages of development when such differences are commonly observed even in the well-recognised species of plasmodia."

A. B.

MACGILCHRIST (A. C.). **Cinchona Derivatives Inquiry. Third Communication. A Synopsis and Discussion of our Present Knowledge of the Molecular Constitution and Pharmacological Action of the more Important Cinchona Derivatives.** *Indian Jl. Med. Research.* 1914. Oct. Vol. 2. No. 2. pp. 516–568.

This is a highly technical paper dealing with the chemistry and pharmacology of the more important cinchona derivatives in an exhaustive manner. Unless he possesses a special knowledge of organic chemistry the ordinary reader will find himself at sea. Hence it is only necessary to mention some of the conclusions at which MacGilchrist's researches have enabled him to arrive. He says that it is now generally accepted that the anti-malarial action of quinine depends upon the residual part of the quinine molecule. This appears to be a derivative of piperidine, a fission product of piperine, an alkaloid of black pepper, and it is interesting to note that some three generations ago piperidine and even black pepper were used with

apparent success in the treatment of intermittent fever. König's ethyl-quinuclidine seems to be the base from which this residual part of the molecule is derived and the author suggests that an enquiry into the anti-malarial action of this substance, of piperidine and of piperidine derivatives would constitute a useful piece of research.



Quinoline.

The quinoline part of the molecule is largely responsible for the bitter taste and unpleasant by-effects of quinine, so it becomes a question if it can be eliminated. This depends on whether or not it is essential as a haptophore group. There seems to be some evidence that it may weaken or hamper the action of the residual part, and although the new compound, ethyl-hydro-cupreine [see this *Bulletin*, Vol. 5, p. 50] appears to negative such an hypothesis, its superiority may depend upon the configuration of the atoms in its molecule (stereo-isomerism). The only known stereo-isomer of quinine is quinidine, but quinine, as we know it, may be a mixture of quinine and stereo-isomers of quinine, the latter being inseparable, chemically indistinguishable and differing only slightly in optical activity. At the same time, quinine and these isomers may, for all we know, differ considerably in anti-malarial power.

It may be that when a sample of quinine is said to be ineffective the condition depends on the absence or paucity of those stereo-isomers with the greatest anti-malarial power. This applies also to cupreine and cinchonine; hence it would be well to compare quinine from different factories and quinine prepared under different conditions (i.e. as regards maximum temperature) in the same factory as regards (1) optical activity and (2) therapeutic value.

A. B.

BLACKWATER FEVER.

HATORI (J.). **Blackwater Fever in Formosa.**—*Ann. Trop. Med. & Parasit.* 1915. Jan. 29. Vol. 8. No. 4. pp. 641–657. With a map.

This paper goes to prove the close association between malaria and blackwater fever. The former is endemic in Formosa, in some parts the benign tertian infection predominating, in others the malignant. Quartan is rather rare save at a place called Yensuiko. New comers, and amongst others Japanese immigrants, are chiefly attacked. The eastern and southern portions of the island are those principally affected and it is here also that blackwater most commonly occurs, as is indicated upon a spot map. Active anti-malarial work is being carried out in certain districts by systematic quinisation of all parasite carriers and fever cases as diagnosed by the microscope.

A table shows that the ratio of blackwater fever cases to the total number of cases treated for malaria differs greatly according to the locality.

In Formosa the Japanese are the most susceptible to blackwater; then come the Chinese; thirdly the Formosans, whose ancestors came from South China; and finally the wild aboriginal tribes inhabiting the central mountains. These last are very rarely attacked, a fact which shows that want of acclimatisation, and especially of malaria immunity, is an important factor.

The condition usually attacks adults from twenty to forty years of age, doubtless because they are more frequently exposed to malarial infection. Cases occur throughout the year but are less prevalent in March, August and September.

As regards the presence of malarial parasites, Dr. NAKAGAWA observed plasmodia in 85 per cent. of cases examined prior to the onset, fourteen being cases of malignant tertian, two of benign tertian and one of quartan. Of cases examined one or two days after the onset only 12·8 per cent. were positive. In Hatori's own cases, 26 in number, parasites were found in 96·3 per cent. prior to the onset of the blackwater. In 25 of the cases *P. falciparum* was the parasite present. The remaining case was one of benign tertian infection.

Length of residence is an important factor in Formosa as elsewhere. From the time of arrival in a malarious district to the first attack of blackwater it is generally over seven months. The influence of quinine in determining an attack was apparent. As Hatori says:—

> "For instance, according to my own observations on 26 cases at Karenko, where the anti-malarial quininisation of parasite carriers (and fever cases) was continued for two months after Nocht's method, in six cases blackwater appeared after the first dose or first day of taking quinine; in 8 cases after 2 days' quininisation; in 3 cases after 3 days, in 2 after 4 days; in 2 after 5 days, and in each of 3 cases after 6, 8 and 10 days respectively, in 2 cases after 11 days, and in the longest one after about 2 months (these latter cases with interruptions of 3 to 5 days)."

He mentions thymol-haemoglobinuria occurring in the course of ankylostomiasis treatment. It is quite different from malarial blackwater. The mortality in Formosa ranges from 10 to 25 per cent., and the condition is more fatal in those who have already had an attack.

Blackwater, however, is fortunately diminishing in Formosa, and is also becoming milder in nature. Amongst garrison troops there has been a great decrease or entire disappearance of the disease. This gratifying result Hatori attributes to the anti-mosquito measures adopted by the garrison troops, and to improved sanitary conditions in their environs. As the result of anti-malarial measures throughout the island it may be expected that blackwater will diminish *pari passu* with malaria.

A. B.

DEADERICK (William H.). **Blackwater Fever. An Analysis of Thirty-four Cases.**—*New York Med. Jl.* 1914. Oct. 31. Vol. 100. No. 18. [Whole No. 1874]. pp. 873–875.

Although it throws little fresh light on the vexed question of the etiology of blackwater fever, this paper by Deaderick is of considerable interest.

Of the thirty-four cases which he analyses, twenty were males and fourteen females. Thirty were whites and four negroes, there being two blacks and two mulattoes. The numbers of the patients varied with the age groups, the greatest number occurring in children between six and ten years. It is worth noting that no less than twenty-seven belonged to the farming class. Alcoholism, cold and other predisposing factors played no great part in determining the onset.

In every case there was a history of malaria. Indeed in most instances there had been repeated attacks. No less than fourteen had previously suffered from blackwater fever, and some had been the victims of several attacks. One had been ill with blackwater seven times, and Deaderick mentions a case under the care of a colleague who died during his eleventh attack. In eleven instances other cases had occurred in members of the immediate family, and three families appeared to show a very marked predisposition. [The author says nothing about possible tendency to paroxysmal haemoglobinuria.]

In only one case were members of the same family affected the same year, and then the interval between the dates of onset was fifty-five days.

In thirty cases quinine was being taken for malaria when the blackwater supervened. In four, quinine could be absolutely excluded. The rest of the record deals with the clinical symptoms. To some of these references may be made. Thus, in speaking of the urine, Deaderick says that "the average variation of albumin was from one-half to two-and-a-half grams to the litre," though specimens were observed containing as much as fourteen grams to the litre.

The blood showed wide variation in its haemoglobin content. The red cells showed polychromatophilia, macro- and micro-cytosis and poikilocytosis. A number of differential leucocyte counts gave the following average proportions:—

Polymorphonuclears	52 per cent.
Eosinophiles	1 ,,
Large mononuclears	35 ,,
Small mononuclears	12 ,,

[The author's classification suggests that large lymphocytes are included under the heading "large mononuclears," but this is not certain. He does not say how many cells were counted at any one examination.]

The blood was examined for parasites from the first to the third day of the disease. In 34 cases *P. falciparum* was found. No other variety was encountered and the plasmodia presented no unusual appearances. [No mention of leucocyte inclusions is made.]

Diagnosis presented no difficulties save in one case, which might have been a true haematuria. The author mentions a case of malaria in which the urine was so loaded with bile pigment that until it was chemically examined the case appeared to be blackwater fever. Singultus is a very bad prognostic sign. None of the cases which recovered showed it. There were ten deaths amongst the 34 cases, two from suppression and eight from exhaustion.

A. B.

STEPHENS (J. W. W.). **Studies in Blackwater Fever. II. A Schedule for recording Cases of Blackwater Fever.**—*Ann. Trop. Med. & Parasit.* 1914. Dec. 15. Vol. 8. No. 3. pp. 639–640.

Stephens prepared a blackwater schedule for his own use but found it difficult to record the data properly owing to the fact that the case reports were often vague, diffused and badly arranged, or displayed omissions. Accordingly he devised a special schedule for analysing case reports. Two examples are appended to his short paper on the subject, one showing the schedule blank, the other partly filled up as an example. On the back of the schedule space is provided for general observations and notes on the post-mortem examination if these are available. The schedule is devised in such a manner that the recorder will have as little writing as possible to do, and yet it is very complete.

[There can be no doubt this schedule will prove most useful and the idea might with advantage be extended to some other tropical diseases. It might possibly have been of interest to include queries as regards a previous history of paroxysmal haemoglobinuria, tick fever or recent tick bite, in view of the fact that everyone is not convinced that malaria plays an invariable part or the most important rôle in the production of blackwater fever.]

A. B.

BARRATT (J. O. Wakelin) & YORKE (Warrington). **The Relation of Bile Pigments to Haemoglobin.**—*Ann. Trop. Med. & Parasit.* 1914. Dec. 15. Vol. 8. No. 3. pp. 509–536. With 8 charts.

The authors refer to their previous work, which proved that haemoglobin passed through the kidneys into the urine about ten minutes after the intravenous injection of rabbits with a solution of homologous haemoglobin in physiological saline. They found, however, that only about one-fifth of what is injected is excreted in this way, and although at the end of six hours the haemoglobinaemia practically disappears there is nothing to show how the haemoglobin has been removed from

the circulation. Their present research, which was also carried out upon rabbits, was devised for the purpose of finding out if, as the work of TARCHANOFF has suggested, the bile pigments are closely related to haemoglobin and are found as a result of blood destruction which is believed to be constantly taking place in normal animals.

They wished to ascertain if the above mentioned injections resulted in the secretion of a bile relatively rich in pigment, and also whether there was any increase in the volume of bile passed, and consequently in the total amount of pigment.

It may be said at once that they found a distinct and immediate increase both in the concentration of bile pigment and in the amount of bile pigment excreted.

As they remark :—" Two hypotheses may be advanced to explain this increase in the amount of pigment excreted, first that the haemoglobin injected is actually converted by the liver into bile pigment, or secondly that it merely stimulates the liver cells to an increased production of bile pigment. Against the former hypothesis is the fact that the increase of pigment is not so great as might be anticipated from the relatively large quantities of haemoglobin introduced into the circulation and consequent high degree of haemoglobinaemia resulting (up to 20 per cent.). The amount of haemoglobin solution found in the plasma of normal rabbits is exceedingly small, varying from ·02 to ·05 per cent. This fact seems to indicate that the degree of red cell destruction normally occurring in the living animal is slight. Assuming that the pigment of the normal bile is derived entirely from haemoglobin set free by the disintegration of erythrocytes normally occurring in the living animal, then it is rather surprising that when the degree of haemoglobinaemia is increased 400 times the amount of bile pigment should only be increased at the most sixfold.

" The work of YORKE and NAUSS showed that the mere introduction of homologous haemoglobin into the veins of normal rabbits was not sufficient to produce jaundice. No icterus of the skin or conjunctivae was observed in an animal which had received intravenously 27 gm. of haemoglobin per kilogramme of body weight. The haemoglobinaemia resulting from such injections gradually disappeared, leaving the blood plasma clear and colourless without any trace of bile pigment. Hence, although from these experiments it appears that intravenous injection of haemoglobin results in an increased excretion of bile pigment, the icterus almost invariably to be observed in blackwater fever cannot be attributed solely to haemoglobinaemia resulting from the great disintegration of red blood cells usually associated with this disease."

The technique is carefully described and certain series of observations were of a laborious nature. One lot necessitated an hourly estimation of the amount of bile excreted and the relative concentration of the pigment it contained carried out for 47 consecutive hours, and then at five-hourly intervals up to and including the 113th hour following the haemoglobin injection. In another series the observations were continued up to the 421st hour.

These and other results are displayed in the form of tables and curves, the former giving the amount of bile passed per hour, the same amount per kilo of body weight, the relative concentration of bile pigment and the relative amount of bile pigment per kilo of body weight. There are also remarks as regards the condition and appetite of the animals employed in the research, and notes on the bile, urine and post-mortem findings.

The original paper should be consulted for these and other details.

A. B.

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Two lengthy reports, on the subject of blackwater fever, which were presented to the fourth Annual Congress of the *Società Italiana di Patologia Esotica*, at its meeting at Messina, on June 27–28th, 1914. Though excellent in style and completeness, it cannot be said that they contain anything which would not be found, in substance, in any good English text-book on tropical diseases.

J. B. N.

LIST OF REFERENCES.

[Continued from BULLETIN, Vol. 4, pp. xxxi-lix.]

For the benefit of recipients of the Bulletin who wish to make a **Card Catalogue,** or to preserve a consecutive record of the references on any subject, **galley proofs** [' *Korrekturbogen* ' ; ' *Première* '] of the **Quarterly Lists of References** (printed on one side of the page) can be supplied at the subscription price of **Two Shillings** per annum. They are obtainable from the beginning of 1914 onwards. Application should be made direct to the Bureau.

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